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## OPUNTIA VULGARIS, MILL.

BY BERTHA L. DEGRAFFE.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 151.

The Cactaceæ, or family of plants to which *Opuntia vulgaris* belongs, is an American aboriginal. But the name *Opuntia*, that Tournefort gave to the large genus of mainly tropical cactuses, which includes the subject of this paper, was applied to an entirely different plant by Theophrastus, a few centuries before the present era. This name is believed to have been taken from that of *Opus*, a city which was then situated in the ancient State of Bœotia, but whose site is now in modern Locris. Since the discovery of America, however, several of the species have been naturalized to the Mediterranean region and now grow there abundantly. The juice of *Opuntia tuna* is said to be used in Naples as a rich carmine pigment.

The members of this genus, or their pear-shaped and often prickly fruits, are popularly designated as prickly pears or Indian figs.

*Opuntia vulgaris* is indigenous to the West Indies and near the east coast of North America, northward to Massachusetts, growing more abundantly in southern climes. The specific name *vulgaris* well signifies the profusion in which the plant may be found growing wild in some parts of this territory, while further westward and southwestward several other species of *Opuntia* are so plentiful as to be troublesome to agriculturists.

Of the numerous species of these plants, which have been more or less medicinally employed, Cactus (*Cereus*, Miller,) *grandiflorus*, Linne, has, of late years, attracted most attention from the medical profession, on account of its reputed effect in cases of functional palpitation of the heart, and in other cardiac disorders.

Other species are well known as the plants on which the cochineal insect feeds. But while of lesser importance in this respect, still *Opuntia vulgaris* shares the utility which the genus thus contributes. Hence, it is cultivated to some extent for economic purposes, and, like the other members of the family, quite frequently for ornamental uses.

The wild plant prefers sandy fields and dry rocks. It is prostrate or spreading. The branches or joints of the stem are light green, broadly obovate, about twice as long as wide, fleshy, varying from about one-fourth to three-fourths of an inch in thickness, and have minute, appressed, subulate, usually deciduous leaves arranged in a spiral order, with clusters of greenish-yellow bristles and spines (which are modified leaves) also in their axils. The buds, which appear upon the surface of the branches, have a resemblance to warts, and from their location project the greenish-yellow bristles, which are composed of numerous rigid, fusiform cells, wedged in among themselves at one extremity. The free ends of these cells are very hard, pointed and retrorse; and on account of these properties and the wedged position, the bristles have such a decidedly barbed character that when their points have pierced the cuticle they are firmly held. This objectionable feature is, of course, increased by the presence of the spines, and is the source of so much annoyance in the handling of the plant that it has been called devil's tongue.

The flower is pale yellow, about two inches broad, and usually has eight petals. The fruit of the order *Cactaceæ*, is a one-celled, many-seeded berry. In the case of *Opuntia vulgaris*, the fleshy fruit has somewhat the shape of a pear or fig, the joint consideration of which fact and of its palatable quality in the ripened state, no doubt, gave rise to the popular names prickly pear and Indian fig. At first it has the color of the stem, and, like it, is bristly, bearing about a dozen clusters of the minute bristles. These persist during the process of ripening, after which process the fruit is otherwise smooth, has a thick rind of waxy appearance, and a crimson or yellowish-purple color externally. It is about two inches long and

about three-quarters of an inch through its greatest diameter, from which it tapers unevenly to the base, as shown in the accompanying figure. It is truncate at the apex, the plane of which is the base of a conical cavity. The fruit contains about thirty seeds and a pulp of a rich, red color, and an acidulous, sweet taste. The average weight of the pears examined was about 20 grammes. Of this amount, more than 50 per cent. were rind; the seed constituted from 4 to 5 per cent., leaving less than half to be made up by the pulp.

The early formation of the coloring matter is of special interest; for almost as soon as the pear assumes definite shape there appears in its centre a speck of color, which increases in size as the pear grows, gradually spreading outward. The rind being the last portion to change color, the fruit is considered to be ripe when the outside is fully reddened. Along the west coast of Florida the ripening takes place about the first of December. The red color may be obtained as a juice having a tinge of purple, by simple expression.

Prof. Henry A. Smeltz, of Tarpon Springs, Florida, to whom I am indebted for valuable information concerning the development of the color, informs me that he has extracted the color by each of the following means, and has found no trouble from the instability of it, even when obtained from half-grown fruit:

(1) By maceration with acetic acid (glacial acetic acid, 1 part; water, 10 parts); this is an original process with him.

(2) By fermentation; he covers the fruit with water and sugar (water, 1 quart; sugar,  $\frac{1}{2}$  pound). Fermentation will proceed far enough in about a week at the temperature of 21° F. He then filters and adds sufficient alcohol to arrest further fermentation.

(3) Maceration with alcohol.

(4) Boiling with as little water as practicable, filtering and adding alcohol.

In all these processes the fruit is first cut into small pieces in order to facilitate the extraction of the color.

The author's experience with the third method was not one of success. One hundred and fifty grammes of the undried, ripened fruit were chopped into small pieces and macerated with official alcohol for five days. The fruit imparted to this solvent a deep wine-red color. The solution was separated from the undissolved material and allowed to stand. After a period of two weeks the color had changed to a light brown, and, upon further standing,

finally became pale yellow. Professor Smeltz attributes this fading of the color to a partial deterioration of the fruit during transportation. Another lot of the undried, ripened fruit was treated with official alcohol; but instead of allowing the red-colored solution to stand, the solvent was recovered by distillation, which left a residue having a bright red color. This residue was soluble in water, but insoluble in ether. Sodium and ammonium hydrates, sodium carbonate, hydrochloric and nitric acids, and ferric chloride, applied to separate portions of the water solution, caused the color to assume a purplish shade. In the cases of nitric acid and ferric chloride this new color rapidly faded. Attention may again be directed to the fact that the cochineal insect feeds upon *Opuntia vulgaris*, and, considering this in connection with the above properties of the coloring matter, it seems at least barely possible that some relation may exist between this coloring matter and carminic acid. The author regrets that the time at her disposal was so limited as to preclude the investigation of this point.

For the purpose of investigating the proximate constituents of the fruit of *Opuntia vulgaris*, a supply was obtained from St. Petersburg, Fla. The material was collected from wild plants. When received the fruit was fully ripened and was still attached to the stem. Work was at once begun upon both parts. The seeds were not removed from the fleshy part of the fruit, but the latter taken in its entirety.

*Proximate Analysis of the Fruit.*—A quantity of the fruit was desiccated until sufficiently dry to admit being reduced to a No. 60 powder, into which state the fruit was brought before it was employed in this analysis. To estimate the moisture that yet remained in the powdered fruit, a weighed quantity was dried in an air bath to a constant weight at a temperature of 110° C. The loss was considered to be moisture; it amounted to 10.08 per cent. of the original weight taken. The dry residue from the above estimation of moisture was incinerated until all free carbon was consumed. The non-volatile residue of the inorganic constituents—or ash of the fruit—was found to equal 9.26 per cent. A qualitative analysis of this ash revealed the presence of potassium, calcium and magnesium in the forms of chlorides, sulphates, carbonates and phosphates.

Another weighed portion of the powdered fruit was treated with



solvents, in order to extract and separate the proximate principles contained therein. These solvents were applied in successive portions until they no longer exerted sufficient action to warrant their further application. After having been left in contact with it for the proper time, the solvents were removed from the undissolved powder. The successive portions of the same solvent were united as they were obtained from this treatment. In the cases of the petroleum ether, ether and absolute alcohol extracts, the whole bulk of liquid was distilled to dryness on a water bath, with the view of recovering the solvents and of obtaining the extracted matter in a form in which it could be weighed. Each of the three aqueous extracts was adjusted to a definite volume, and its contents of total solids determined by evaporating an aliquot part of the volume to a constant weight on a water bath. The residue so obtained was incinerated, in order to ascertain the amount of inorganic constituents, so that the deduction of their weight from the total solids would give the amount of organic solids. The ashes of petroleum ether, ether and absolute alcohol extracts are usually so slight that they were disregarded in this work. After the last portion of petroleum ether had been poured off from the undissolved powder, the latter was freed from the last traces of the solvent before the use of ether (which was the next solvent to be applied), by rotating the flask containing the powder on a hot water bath. This operation was repeated after the use of ether and of absolute alcohol, respectively. But, for obvious reasons, such a procedure was unnecessary after the treatment with water, alkaline water and acidulated water.

Petroleum ether removed extract to the extent of 2.16 per cent. This extract was semi-solid. It readily liquefied at the water bath temperature. The extract was treated with hot alcohol. This solvent made known the presence of a wax which was but sparingly soluble in it. Repeated treatment with hot alcohol finally dissolved the wax and left some caoutchouc.

Ether extracted from the fruit .81 per cent. of brown, resinous substance, which had a slightly bitter taste. The extract was treated with water, slightly acidulated with sulphuric acid; this liquid dissolved one-half of it. Neither Mayer's reagent, potassium tri-iodide nor picric acid, when added to this solution, gave any evidence of alkaloids, nor did treatment with Fehling's solution, either before or after the boiling of the acidulated solution, serve to indi-

cate the presence of glucosides. Some of the acidulated solution was agitated with petroleum ether, ether and chloroform in succession, and subsequently rendered alkaline by the addition of ammonium hydrate, and again agitated with more of the same solvents in the same order; but, upon evaporation of the solvents, there was nothing obtained to indicate either alkaloids or glucosides. Nor could these principles be detected in 200 grammes of the stem which were examined in the same manner.

Hot alcohol was poured on the filter containing that part of the ether extract which was insoluble in acidulated water. This solvent dissolved about one-half of the filter's contents. The alcoholic solution gave, with ferric chloride, an olive-green precipitate, and with alcoholic solution of lead acetate a yellowish-brown precipitate. When some of the alcoholic solution was poured into water a turbidity was produced. The remaining fourth of the ether extract, which was not dissolved by either acidulated water or hot alcohol, was found to be soluble in an aqueous solution of potassium hydrate; and from its solution in that liquid the addition of diluted sulphuric acid in excess caused a precipitate of brownish-black substance.

Absolute alcohol dissolved 10.64 per cent. of the weight of the powdered fruit. The extract was of a blackish-red color, with a tinge of purple. It had an odor like that of prunes. It required prolonged drying at 110° C. before a constant weight was reached, and when this had been attained the extract was still of a semi-solid consistence. The process of drying did not affect the color or odor.

The extract was treated with water and the insoluble part filtered off. The filtrate had an acid reaction. With lead acetate it gave a whitish precipitate, while with ferric chloride but little change was observed, thus showing the absence of tannin from this extract. The tests for alkaloids and glucosides were attended with negative results.

To estimate the sugar in this and the other extracts, a quantity of the water solution of the extract was completely precipitated with lead acetate for the purpose of removing extractive matter, which otherwise might have interfered with the accuracy of the results. The mixture was filtered and the precipitate washed. The washings were added to the filtrate, and the latter saturated with

hydrogen sulphide to precipitate the excess of lead. The resulting lead sulphide was removed by filtration, the precipitate washed and the filtrate and washings warmed on a water bath to expel the excess of hydrogen sulphide—lead acetate paper being used to determine the complete expulsion of this gas. The liquid was then allowed to cool and afterward adjusted to a definite volume. One-half of this volume was made slightly alkaline with sodium hydrate, then warmed gently and filtered. The filtrate and washings of the filter were mixed with an equal volume of Fehling's solution, and then heated on a water-bath at the boiling point for twenty minutes. The cuprous oxide which had separated during this time was collected on a filter, washed with hot water until free from alkali and soluble copper compounds, then dried and converted into the more stable cupric oxide by igniting until a constant weight had been reached. The actual weight of glucose in the quantity of extract operated on was calculated by taking 45 per cent. of the weight of the cupric oxide and the percentage amount by simple proportion, of course, to the weight of the powdered fruit represented by the above quantity of extract. The amount of glucose found in the absolute alcohol extract was .83 per cent. To determine the saccharose, it was inverted by boiling the other half volume with some diluted sulphuric acid for an hour, and, after allowing the solution to cool and making it alkaline, the determination was proceeded with as in the foregoing estimation of glucose.

From the whole quantity of glucose indicated by the weight of cupric oxide obtained, the previously determined quantity of glucose was deducted. Of the remainder, which represented the amount of glucose produced from the saccharose by inversion, 95 per cent. was taken as the amount of saccharose required to yield it, *i. e.*, the amount of saccharose present. Of this sugar 7.22 per cent. was found. That part of the extract which was undissolved by the water was found to be soluble in solution of potassium hydrate. When its solution in the latter solvent was acidified with diluted sulphuric acid, a brownish precipitate was produced. An alcoholic solution of some of that part of the extract which was undissolved by water gave, with alcoholic solution of lead acetate, a brown precipitate, and with ferric chloride a very slight precipitate.

The water extract of the powdered fruit amounted to 16.59 per cent. of organic solids. This amount included .92 per cent. of glu-

cose and .30 per cent. of saccharose. Neither gelatin and alum solution nor ferric chloride indicated the presence of tannin. A portion of the water extract was mixed with 4 volumes of absolute alcohol and set aside for twenty-four hours. The precipitate of mucilaginous and albuminous matter was collected on balanced filters, washed and dried. It equalled 3.76 per cent. of the weight of the powdered fruit.

When a weakly alkaline water was applied to the residue from the treatment of the powdered fruit with water and the other three solvents, 5.02 per cent. of organic matter was dissolved.

Some of this alkaline solution was made slightly acid with acetic acid, and then mixed with four volumes of absolute alcohol. The mucilaginous matter which was precipitated represented 2.35 per cent. of the fruit.

Water acidulated with hydrochloric acid removed 1.91 per cent. of organic solids. This acid solution did not contain phosphates. After the powdered fruit had been subjected to the action of all of the foregoing solvents in the cold, the remaining undissolved portion was washed free from hydrochloric acid, and then boiled for some minutes in water. The mixture was allowed to become cold, and a portion of the water tested with potassium tri-iodide for starch; but this substance was not found. The mixture was then filtered, and after the residue had been expressed to further rid it of water, it was dried, weighed, and finally incinerated. The weight of the ash obtained by this operation was deducted from the weight of the residue before incineration, in order to ascertain the amount of insoluble organic matter. The difference showed 37.07 per cent. of this substance.

The stem was found to contain 86.63 per cent. of water and .21 per cent. of ash. The constituents of this ash were the same as those found in the ash of the fruit.

According to the "Food Products of American Indians," the fruit of *Opuntia vulgaris* is a favorite article of diet with this race of people. The tribes of the southwestern part of the United States call the fruit by the Spanish name, "tunis," which is more than probably derived from their use of the fruit of *Tuna* species. They dry great quantities of it for winter use. In gathering it they brush off the spines with a bunch of grass. The Apaches, however, use wooden tongs, or hooked sticks, to gather the fruit. The

Pawnees and Papagoes employ it in cooking meat, and, for this purpose, collect it while unripe, and allow it to dry. Then, again, the fresh unripe fruit is often boiled with water for ten or twelve hours, or until a product which has the appearance of stewed apples is obtained. This is then allowed to ferment, and, thereby becomes stimulating, as well as nutritious, and, owing to these properties, it frequently serves to sustain life in the absence of other food.

That the fruit of *Opuntia vulgaris* should find such an important economic use as that of a food is no matter of wonder when we consider the amounts of assimilable matter that it contains in the forms of mucilage, albuminoids, nutritious extractive matters and particularly its large percentage of sugars, and also its freedom from astringent and toxic principles. Its established popularity with the Indians is likely in greatest measure due to its acidulous, sweet pulp, which has been to them an incentive to collect it in spite of its defensive character.

On account of its formidable spines and fleshy, unflammable nature, *Opuntia vulgaris*, like many other species of this genus, is used for hedges, especially along railroads. The use of the plant as a food for cattle is somewhat lessened by the spines, but these obstacles are removed by the cowboys with their bowie-knives or by throwing into a fire, whereby the spines are scorched to such an extent that they drop from the plant.

In Mexico the fruit of the various opuntias is known as *tuna*. They are regarded as possessing diuretic properties, and are employed for curing diarrhoea, while the juice is used in biliary affections. The flowers have the reputation of being useful in pectoral complaints.

For further details concerning the genus *Opuntia*, the following literature may be consulted:

1884. W. W. Light, AM. JOUR. PHAR., 56, 3.

1888. *Kew Bulletin*, p. 170.

1891. Maisch, AM. JOUR. PHAR., 63, 2.

1895. Mueller, *Select Extra-Tropical Plants*, 9th edition, p. 341.

Although there are several factories in the vicinity of New York devoted to the preparation of horse-meat for food, it is comfortable to be reassured by the chemist of the Board of Health that not an ounce of it is sold in this city, unless it be in the shape of imported sausage. It is also stated by these authorities that the flesh of the horse is easily detected by the usual iodine test for starch, which it contains in contradistinction to all other butchers' meat.

—*Medical News*, February 8, 1896.



## A PROXIMATE ANALYSIS OF POLYGALA SENEGA.

BY J. HENRY SCHROEDER.

Contribution from the Chemical Laboratory of the Philadelphia College of Pharmacy, No. 152.

The chemistry of *Polygala Senega* has been carefully elaborated by a number of previous investigators.<sup>1</sup>

The most important constituents and active principles have been pointed out, and the absence of a number of constituents has been proven. The results, however, still indicate that something is lacking; for in the absence of starch, tannin, inulin, and notable quantities of sugars, mucilage and pectin, the soluble constituents of the drug are not all accounted for. With this fact in mind, a preliminary investigation was undertaken by following Dragendorff's scheme, and then special extractions and estimations were made, with results to be given in the latter part of this contribution.

Petroleum ether extracted 5.62 per cent. of volatile and fixed oils. This residue, when heated in an air bath at a temperature of 110° C., was deprived of 0.12 per cent. of volatile oil; as has been pointed out by other investigators, this volatile oil is composed largely of methyl salicylate. L. Reuter pronounced the presence of 0.25–0.33 per cent. of methyl salicylate. The remaining fixed oil amounted to 5.50 per cent.; it was of a yellowish-brown color, neutral in reaction, and of a peculiar odor. It saponified in both aqueous and alcoholic potash solution; the specific gravity of the oil was approximately 0.936 at 25° C.

The concentrated ether extract represented 2.30 per cent. of the drug. Its color was slightly yellowish, and, when viewed under a lens, presented an oily appearance. Cold distilled water dissolved 0.16 per cent. of this extract; the aqueous solution readily reduced Fehling's solution. The test for alkaloids was applied with negative results.

The resinous extractive was entirely soluble in hot 95 per cent. alcohol, and amounted to 2.14 per cent.

Absolute alcohol extracted 6.56 per cent. of the drug; the result-

<sup>1</sup> 1804. Gehlen, *Berliner Jahresb.*, 112.

1836. Quevenne, *Journ. de Pharm.*, 22, 449.

1860. Procter, *AM. JOUR. PHARM.*, 32, 149.

1881. Goebel, *AM. JOUR. PHARM.*, 53, 321.

1889. Reuter, *Archiv der Pharm.*, 309 and 452.

ing extract was light brown in color, transparent, and had the characteristic odor of the drug. This residue was treated with several successive portions of cold distilled water; the aqueous solution was then tested for tannin with the following result:

Ferric chloride: brown color, no precipitate.

Bromine water: slight precipitate of a yellowish color.

Gelatin in presence of alum: cloudiness and very slight precipitate.

Freshly prepared lime water: yellow color, no precipitate.

Another portion of the aqueous solution was shaken out with acetic ether, until the latter remained colorless. The ethereal solution was evaporated on a water bath, and the residue treated with cold distilled water; a resinous white substance deposited. After warming the solution, the clear supernatant liquid gave the following reactions for tannin:

Ferric chloride: brown color, no precipitate.

Bromine water: yellow color, no precipitate.

Gelatin in presence of alum: cloudiness, no precipitate.

Freshly prepared lime water: yellow color, no precipitate.

These results indicate the absence of tannin in the drug.

The aqueous extract from the alcohol residue, after previous shaking out with acetic ether, was precipitated with neutral and basic lead acetate, the former producing a slight, the latter a copious precipitate, distinctly yellowish in color. The glucose present in the alcoholic extract amounted to 0.08 per cent., the saccharose to 0.50 per cent. Mayer's reagent gave no precipitate. The portion not dissolved by water was 5.98 per cent. This was probably largely composed of polygalic acid.

Cold distilled water extracted 14.02 per cent. of the drug. The infusion presented a frothy appearance. It contained 2.68 per cent. of glucose, and 5.32 per cent. of saccharose. On precipitating dextrin in the usual way, by absolute alcohol, it yielded only traces.

An attempt was made to remove the saponoid principle from this infusion by means of several methods.

A portion of the dilute infusion was shaken out with chloroform; although caution was exercised in shaking, it was almost impossible to separate the chloroform in a perfectly clear state, but it appeared frothy.

By slightly warming this chloroformic solution in a water bath, it

became clear, but, on cooling, it again became cloudy and frothy, and presented the appearance of a supersaturated solution of some saponoid principle. Upon recovering this chloroform by distillation on a water bath, there remained as residue a small amount of a yellowish, transparent substance, which did not froth with water, and was not affected by a drop of concentrated sulphuric acid.

Another portion of the aqueous extract was evaporated to a syrupy consistency on a water bath, this residue digested during about five minutes with boiling 95 per cent. alcohol, in several portions, until the washings remained colorless. On cooling, the mixed washings became opaque and deposited a sediment. The latter was treated with several portions of warm 95 per cent. alcohol, filtered, evaporated to small volume, and allowed to crystallize.

The residue consisted of microscopic crystals, of a yellowish tinge, a peculiar odor and a very acrid taste. A very small quantity produced with cold water a decided and permanent frothing. With sulphuric acid it produced a red color, gradually changing to a beautiful violet color. The amount was too small to permit of further purification.

Pectin and albuminoids, separated from the drug by dilute alkali, amounted to 18.40 per cent. This was found to consist almost entirely of albuminoids, and, as it is rather an unusually large percentage, it will be especially mentioned later in this paper.

The ash of the drug amounted, on an average of two estimations, to 6.65 per cent. It consisted of calcium, traces of potassium, with carbonic, phosphoric and sulphuric acids, and a small quantity of silica.

TABULATED RESULT OF PROXIMATE ANALYSIS OF SENEGA ROOT.

	Per Cent.	Per Cent.
Soluble in petroleum ether :		
Volatile oil . . . . .	} 0.12	5.62
Fixed oil . . . . .		
Soluble in concentrated ether :		
Resin . . . . .	} 2.14	2.30
Soluble in water . . . . .		
Soluble in absolute alcohol :		
Glucose . . . . .	} 0.08	6.56
Saccharose . . . . .		
Impure polygalic acid and resin . . . . .		

	Per Cent.	Per Cent.
Soluble in cold distilled water :		
Glucose . . . . .	2'68	
Saccharose . . . . .	5'32	
Mucilage . . . . .	1'95	
Extractive (saponin, etc.) . . . . .	4'07	14'02
Soluble in alkaline water (0'1 per cent. NaOH):		
Pectin and albuminoids . . . . .	18'40	
Extractive . . . . .	2'16	20'56
Soluble in acid water (1 per cent. HCl):		
Pararabin . . . . .		1'60
No starch.		
Lignin . . . . .		11'60
Cellulose . . . . .		19'30
Moisture . . . . .		3'25
Ash . . . . .		6'65
Loss . . . . .		8'54
		<hr/> 100'00

On exhausting the drug (which had previously been percolated with acetone and freed from it) with cold distilled water, an infusion of a reddish-brown color was obtained, which was very frothy. After precipitating with basic lead acetate, I found 3.95 per cent. of glucose and 6.05 per cent. of saccharose. An attempt was made to secure the saponiod principle, with the same result as stated before.

In order to ascertain the character of the mucilage, pectin, etc., I made the following experiments:

About 100 grammes of the drug were exhausted with distilled water at ordinary temperature. The infusion was evaporated at low temperature on a water bath to about 150 c.c. The solution appeared very frothy. From this solution I precipitated the mucilage with five volumes of 95 per cent. alcohol. The mucilage was boiled, during two hours, with 1 per cent. sulphuric acid. A small amount of substance had precipitated out; the filtered liquid readily reduced Fehling's solution. It was then carefully neutralized by sodium hydrate solution, an excess of sodium acetate added, and then some phenyl-hydrazine-chloride, and the whole warmed on a water bath during half an hour. After standing twenty-four hours, lemon-yellow aggregates of an osazone had deposited. These were redissolved in cold 95 per cent. alcohol. On spontaneous evaporation, a small quantity of microscopic crystals had deposited.

After exhausting the drug with distilled water, it was treated with water, to which was added enough sodium hydrate solution to make the menstruum distinctly alkaline. Three macerations, of twenty-four hours each, practically exhausted the drug. The infusion had the appearance of an emulsion, due to the saponification of the fats and resins. It was evaporated at a very low temperature, on a water bath, acidified with acetic acid, and then precipitated with 5 volumes of 95 per cent. alcohol, resins and oil being held in solution. After draining, this precipitate was suspended in 1 per cent. solution of sulphuric acid, and boiled during two hours. The filtered liquid reduced Fehling's solution; with phenyl-hydrazine-acetate when treated as before, it formed only a slight precipitate of an osazone after twenty-four hours' standing. This indicated that only a small amount of the alkali portion consisted of pectin.

Lastly, the remaining drug was exhausted with boiling distilled water, evaporated as above, and precipitated with 95 per cent. alcohol; the precipitate was heavy and gelatinous. This was suspended in water containing 1 per cent. sulphuric acid, as before; after boiling, a residue remained undissolved. The filtered supernatant liquid reduced Fehling's solution readily, and gave a comparatively large amount of osazone when treated with phenyl-hydrazine-acetate.

The substance, which was not redissolved in the acidulated water, was found to be insoluble in all solvents tried, also in alkaline or acid solution.

In order to determine the amount of nitrogen in the drug, I estimated 1 gramme by the Kjeldahl method; the yield was 2.33 per cent. of nitrogen, corresponding to 14.56 per cent. of albuminoids, the factor employed being 6.25.

Thinking this to be a rather large amount, I made another estimation of 0.50 grammes by combustion with soda-lime. By this method I obtained 3.6 per cent. of nitrogen, corresponding to 22.50 per cent. of albuminoids. A second estimation yielded exactly the same amount.

With a view of determining whether or not this large amount of nitrogen could be due to the presence of asparagin, I made an examination for the latter by Dragendorff's method.

When the liquid was boiled with diluted HCl to decompose the asparagin, a heavy precipitate separated out. The supernatant



liquid was golden-yellow in color; on the addition of potassium hydrate solution, its color changed to a reddish shade. The precipitate was readily soluble in ammonia water, with a yellow color.

By this process I found only 0.62 per cent. of asparagin to be present. It will be seen in the first part of this contribution that the total amount of alkaline extractive represented 20.56 per cent. of the drug, and that 18.40 per cent. were precipitated as albuminoids and pectin, whereas the total amount of albuminoids, as calculated from the amount of nitrogen present, represented 22.50 per cent. Previous investigators have shown, however, that the albuminoids of senega are partly soluble in water, and it is, therefore, likely that a portion was extracted by the distilled water previous to maceration with alkaline water.

I beg to express my thanks to Professor Trimble for his many suggestions and valuable aid.

March, 1896.

## THE COLORING MATTER OF THE ARIL OF CELASTRUS SCANDENS.<sup>1</sup>

BY IDA A. KELLER, PH.D.

This paper contains the following general observations on the coloring matters of plants. The protoplasmic corpuscles have been appropriately designated *chromatophores*. It has been observed that, as a rule, yellow, orange and brown (sometimes blue) coloring matters are deposited in such chromatophores; while white, violet, blue and red (sometimes yellow) are usually caused by a solution of the pigment in the cell sap. It has been found desirable to make a distinction between the kinds of chromatophores. They are, for convenience, classified as follows: chloroplasts, chromoplasts and leucoplasts; the latter class, which are the colorless color bearers, being one of the contradictions in which the systems of human classifications abound. The bond of sympathy is, however, their common origin—the fact that one may be converted into the other, according to the conditions, and each one can originate only as a result of the division of pre-existing chromatophores.

<sup>1</sup> A paper read before the Botanical Section of the Academy of Natural Sciences of Philadelphia, and abstracted and condensed for the AMERICAN JOURNAL OF PHARMACY.  
G. M. B.

Chloroplasts, as their name indicates, are the green bodies which impart the green color characteristic of leaves and stems. The pigment in this case can be readily extracted by means of such solvents as alcohol, ether and chloroform, while the matrix remains behind as definitely shaped, colorless masses of protoplasm. The pigment itself may, under the influence of various factors, external or internal, undergo modifications into chemically different substances, such as etiolin. Chloroplasts include all colored chromatophores not green. The distinction is quite an arbitrary one.

Chromoplasts may originate from leucoplasts or chloroplasts. The latter may easily be observed in the ripening of many fruits. The new substances resulting from this metamorphosis are not well known.

The red color of fruits undergoes change when preserved in 50 per cent. alcohol, due, no doubt, to oxidation of the pigment. Those of *Ilex verticillata* become brown; of *Magnolia glauca*, dark brown; of *Lindera benzoin*, almost black; of *Berberis Thunbergii*, light brown; of *Cratægus coccinea*, dark brown. In rare instances, however, the red color does not seem to be affected by alcohol, as, for example, the berry of *Arisæma triphyllum* and the aril of the seed of *Celastrus scandens*.

A microscopical and chemical examination of the latter was undertaken. The section showed the following anatomical structure: a very much thickened cuticle of a lemon-yellow color. This, without a doubt, affects the tint which has some yellow in it.

Courchet<sup>2</sup> states that the color of certain fruits is entirely due to the impregnation of pigment in such epidermal thickenings, and cites, as illustrations, *Solanum macrocarpum* and *S. racemiflorum*. The epidermis consists of a layer of small cells of a rather uniform size. The chromatophores within these are very conspicuous; they are bright red in color, and in form very narrowly spindle-shaped, and lie parallel to each other, being rather closely packed. Below the epidermis, the cells constituting the rest of the pulp of the aril are of larger dimensions, and the chromatophores seem to be irregularly scattered through the cells.

According to Zimmerman,<sup>3</sup> the pigments of chromatophores found

<sup>2</sup> "Recherches sur les chromoleucites," *Annales de Soc. Nat. Bot.*, Ser. VII, T. VII, 1888, p. 301.

<sup>3</sup> Zimmerman, "Botanical Microtechnique." Translated by James Ellis Humphrey, New York, 1893.

in phænogams, in regard to which we have little definite description, are as follows: (1) chlorophyll green; (2) carotin, including chlorophyll yellow; (3) xanthin; (4) coloring matter of Aloe flowers. Our knowledge of these, with the exception of chlorophyll, is uncertain. A formula is attempted only for carotin, which is said to be  $C_{36}H_{38}$ .

The great difficulty experienced in investigating these pigments is their unwillingness to crystallize. Carotin is the only one of these four which occurs within the cell in a crystalline shape, and which can be again crystallized when extracted from the plant.

Carotin is found as a crystalline secretion in the root of *Daucus Carota*, also in red flowers and fruits. It imparts a blood-red color to carbon bisulphide, in which it is readily soluble, and from which it may be obtained in the form of a crystalline precipitate by the addition of alcohol. I found that the pigment of the aril of *Celastrus scandens* was soluble in carbon bisulphide, forming a deep red solution, but no precipitate was visible on the addition of alcohol. After evaporation, an amorphous, sticky mass resulted, and it will thus be seen that it differs from carotin in this respect. The well-known solvents behaved as follows: water, no visible effect; alcohol, 50 per cent., no visible effect on the chromatophores, but the solution was slightly tinged yellow; alcohol, absolute, more soluble and the solution of a deeper tinge; ether, about like 50 per cent. alcohol, but a greater amount of yellow residue left on evaporation;<sup>4</sup> acetone, about like 50 per cent. alcohol; chloroform, much more soluble, solution deep red; carbon bisulphide, a deep red solution, similar to chloroform.

Carotin, according to Arnaud, is insoluble in water, almost so in alcohol, very slightly soluble in ether and most so in chloroform and carbon bisulphide. These solutions are colored yellow to orange-yellow, according to their degree of concentration, while the solution of carotin in carbon bisulphide is always blood red.<sup>5</sup>

Comparing this statement with what I have observed regarding the pigment under consideration, we find that there is a close similarity in reference to its solubility and that of carotin.

With concentrated sulphuric acid the chromatophore changed first to a greenish color and then to a decidedly purple-blue. This

<sup>4</sup> It is possible that the yellow matter, with which the cuticle is impregnated, influences, to some extent, the color imparted to solvents.

<sup>5</sup> Zimmerman, *Microtechnique*, p. 102.

same change of color was effected when concentrated sulphuric acid was added to the chloroform solution. With iodine solution in potassium iodide the chromatophores turn blue-green, like the color characteristic of the Cyanophyceæ. According to Zimmerman,<sup>6</sup> carotin thus treated yields a greenish or greenish-yellow color, and with concentrated sulphuric acid, first violet and then indigo-blue.

There is certainly much resemblance also between the effect of iodine and concentrated sulphuric acid upon carotin and upon the red pigment of *Celastrus scandens*.

Lacking, however, complete correspondence, I next determined to discover if it approached xanthin more closely in its properties. It differs from this in its most conspicuous, although on that account by no means most important property, and that is its color. Xanthin, as described by Zimmerman,<sup>7</sup> occurs in yellow chromoplasts in amorphous form, and especially in small granules. Its alcoholic solution leaves, on evaporation, a wholly amorphous resin-like mass. It is insoluble in water, little soluble in ether, chloroform and benzin, but more so in alcohol. With concentrated sulphuric acid the isolated pigment, as well as the chromoplasts, takes first a greenish, then a blue color; with iodine in potassium iodide it gives a green.

It will be seen from this that while the red pigment of *Celastrus scandens* differs from xanthin in its solubility, it agrees with it more closely in regard to the effect of sulphuric acid than it does with carotin. Another striking resemblance with xanthin is the resin-like amorphous residue left when the solvents are evaporated.

The coloring matter of *Celastrus scandens* is also remarkable for its resistance to the action of alkalies. Boiling with potassium hydroxide does not decompose it.

From the behavior of this coloring matter with solvents and other reagents, we must conclude that in it we find a connecting link between the crystallizing carotin of red flowers and fruits and the amorphous resin-like xanthin of yellow flowers, and these observations tend toward the confirmation of Courchet's views, that the pigments of yellow and red chromatophores, having the property of turning blue or green with sulphuric acid, thus distinguished from all other pigments, represent a group of closely related compounds, whose composition certainly demands further investigation.

<sup>6</sup> *Ibid.*

<sup>7</sup> *Ibid.*, p. 103.

## DISTILLED WATER.

CINCINNATI, March 6, 1896.

*Editor AMERICAN JOURNAL OF PHARMACY.*

DEAR SIR:—In my article, "Distilled Water," this JOURNAL, January number, 1896, p. 1, is found the following passage:

"On determining the amount of this matter, it was found that 100-000 c.c. left 1·8 gramme of residue, which proved to be dissolved stone and constant. Tucker<sup>1</sup> gives the following limits of observed residues with glass condensers:

"100-000 parts of water left from 2·20 to 23·00 parts of residue."

It was an oversight to put in the words "with glass condensers," and thus inadvertently make Dr. Tucker responsible for the assertion that 100-000 parts of such distilled water contains 23·00 parts of solids. Dr. Tucker, in his paper, clearly states that most of the samples of water consisted of impure rain water or mere tap water.

My object in referring to the paper of Dr. Tucker was to show that my figure, giving the amount of residue (1·8 gramme) in 100-000 parts of water made with a stone still and worm, was lower than the lowest in the commercial samples analyzed by Dr. Tucker.

The reader of the paper would unquestionably perceive that Dr. Tucker could not have made so improbable an assertion as that 23·00 parts of solids could be present in 100-000 parts of official distilled water.

Dr. Tucker (according to private information kindly extended to me) regards 1 part of residue in 100-000 parts as the maximum amount in good distilled water, made with glass condensers.

Respectfully,

J. U. LLOYD.

## PREPARATION OF LINIMENT OF SOFT SOAP.

BY C. E. SMITH.

This liniment may be made by a simple method, which accomplishes the formation of the soap and of the liniment at the same time, and gives, in addition, a product of more uniform strength than is possible by the older mode of preparation.

<sup>1</sup>"The Adulteration of Drugs." A lecture delivered before the Department of Chemistry of the Brooklyn Institute of Arts and Sciences, May 24, 1895, by Willis G. Tucker.



It consists in shaking a mixture of fixed oil, potassa solution and alcohol, until saponification has taken place, and then adding the remaining ingredients.

To make a liniment by this process, that will meet the Pharmacopœial requirements, the formula would be as follows :

Linseed oil . . . . .	325 gms
Potassa . . . . .	75 "
Oil of lavender . . . . .	20 c.c.
Alcohol . . . . .	300 "

Water, a sufficient quantity to make 1,000 c.c.

Dissolve the potassa in 200 c.c. of water; put the solution in a bottle of about 1,500 c.c. capacity, together with the linseed oil and the alcohol, and shake the mixture briskly from time to time, until there is no further separation of oil on standing. Let the solution stand in a moderately warm place for twenty-four hours, then dissolve in it the oil of lavender by agitation, and add enough water to make the product measure 1,000 c.c. Mix and filter.

The potassa should be neither stronger nor weaker than 90 per cent., unless allowance be made for the difference in strength.

The length of time required to finish the preparation depends upon the persistence with which the mixture is shaken at the beginning, but it can easily be done in two days, at least with quantities not much differing from those of the formula given above. Saponification can, of course, be hastened by heating the mixture, but the gain in time would be more than counterbalanced by the risk of vaporizing some of the alcohol.

Some of the constituents of oil of lavender being easily acted upon by caustic alkali, this oil should not be added until saponification is complete. About twenty-four hours time, after complete solution of the linseed oil, is required for this, when the liniment is made at the ordinary temperature.

Refined cottonseed or olive oil may be used instead of linseed oil, without changing the proportion of potassa, but these will usually give a liniment of lighter color than would be obtained from linseed oil.

BROOKLYN, N. Y., March 16, 1896.

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The French War Office has ordered the use of aluminum drinking and mess vessels for the army, which are made without solder, being beaten up from plate. They resist the action of fire, foods and cooking liquids, which are not in contact with the metal for long periods.

ASSAY OF NUX VOMICA.

By C. E. SMITH.

During several years' experience in assaying this drug and its preparations, a method has gradually developed, which is believed to have some advantages over the others now in use, so far as the writer is familiar with them. Its chief recommendations are that accurate results can be obtained by it without much practice, being quite simple, and that it requires no more time and attention than other methods, which are expected to give only approximate results.

The underlying principles made use of are well known, and have been used for similar purposes before, but the arrangement of details is the outcome of considerable practice, and a number of changes were found necessary or desirable before the process assumed its present form, in which it has now given uniform satisfaction for nearly two years. In one feature it is merely a modification of Keller's method, which apparently was not designed for highly accurate work, but intended only as a rough guide for the pharmacist.

The method to be described consists in exhausting the drug with weak acetic acid, evaporating the acid liquid to dryness, dissolving the extract in a very little alcohol and ammonia, then shaking this once with a large quantity of ether and chloroform, and finally titrating the separated alkaloids.

The following are the particulars :

Place 10 gms. of the powdered drug and 100 c.c. of 10 per cent. acetic acid into a bottle provided with a tight stopper, and shake frequently during twelve hours. Filter the acid solution and wash the residue on the filter with cold water until the washings are tasteless. Evaporate the solution in a shallow vessel to dryness on a water bath. While still warm, add to the extract 6 c.c. of a mixture consisting of equal volumes of strong alcohol and 10 per cent. ammonia water, and rub them together by means of a rubber-tipped glass rod, until a uniform thick syrup results. Transfer this to a separator containing 40 c.c. of ether and 45 c.c. of chloroform. Wash the extract still remaining in the evaporating dish into the separator with 6 c.c. more of the alcohol-ammonia, applying it in three or four successive portions. Cork the separator and shake vigorously for five minutes, then let it stand undisturbed for an hour. Filter the ether-chloroform solution through a small dry filter into a flask of about 200 c.c. capacity, washing the filter at the end with ether-chloroform. Distil off the solvent on a water bath, dissolve the alkaloids in a little alcohol with aid of heat, and add a few drops of methyl-orange or hæmatoxylin solution. Then dilute with water and titrate with decinormal acid.

The value of weak acetic acid in the extraction of alkaloids is being more and more recognized, and it is peculiarly applicable here, because it admits of using the drug in a coarsely divided state—the condition in which it is most readily obtained for assay—without risk of incomplete exhaustion. Moreover, it dissolves comparatively little coloring matter, excludes fats entirely, and can easily be gotten rid of by evaporation, without in the least injuring the alkaloids.

Alcohol and ammonia, in the proportions given, make the best solvent for the extract remaining after evaporating the acetic acid, and answer equally well, when the process is applied to the several alcoholic preparations of *nux vomica*. Only a little of this mixture is needed, and, by keeping the volume of the alkaloidal extract low at this stage, the next step of shaking out is much simplified, in that a single application of ether chloroform is sufficient to withdraw the alkaloids completely, any tendency to emulsify being entirely obviated at the same time.

A mixture of ether and chloroform is preferable to chloroform alone, as it enables the isolation of the alkaloids in a purer state. These still contain about 5 per cent. of impurities, however, making estimation by weight impracticable. But by titration quite accurate results are obtained, if the indicator used is fairly sensitive, and the endreaction is not materially obscured by the small quantity of coloring matter present.

The ether-chloroform solution may be drawn from the separator and filtered just as soon as the dark-colored extract has risen to the top, but in that case filtration will be very slow from clogging of the filter by small particles suspended in the solution. It is better to let it stand one or two hours, or over night, before filtering.

The method has been found equally useful as a means of standardizing the galenical preparations of this drug.

BROOKLYN, N. Y., March 16, 1896.

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It has been definitely decided that the *British Pharmaceutical Conference* shall commence its sessions in Liverpool on Tuesday, July 28, 1896.—*Pharmaceutical Journal*.

*A Three Months' Vacation by Our General Manager*, is the title of a neat booklet, issued by the Smith, Kline and French Company, containing an account of what Mr. Kline saw in Europe during the summer of 1895.

BOTANICAL NOTES.

BY CLEMENT B. LOWE.

Contribution from the Botanical Laboratory of the Philadelphia College of Pharmacy.

STEM MARKINGS.

Attention is called to some interesting markings found on some stems of *Magnolia*, (species unknown) procured early in February.

An inspection of the axillary buds with the scars beneath them, caused by the detachment of the petioles of the leaves, will show that, taken together, they resemble in a remarkable manner the wrinkled face of an old man, surmounted by the kind of a head-dress worn by bishops and cardinals, known as the mitre.

The markings which look like eyes and nostrils were made by the vascular bundles, which ran from the stem into the petioles of the leaves, while the mitre is formed by the axillary bud.

A MONSTROSITY.

Through the courtesy of Mr. F. W. E. Stedem, a peculiarity in plant growth was recently placed in my possession. It was received by him from a gardener in Bucks County, Pennsylvania.

It is probably *Anthemis nobilis*. The stems, instead of being slender and about  $\frac{1}{8}$  or  $\frac{1}{16}$  of an inch in diameter, are flattened, and an inch or more in width. This peculiar development probably arose from the union in growth of a large number of the ordinary stems.

INDIAN ACONITE.

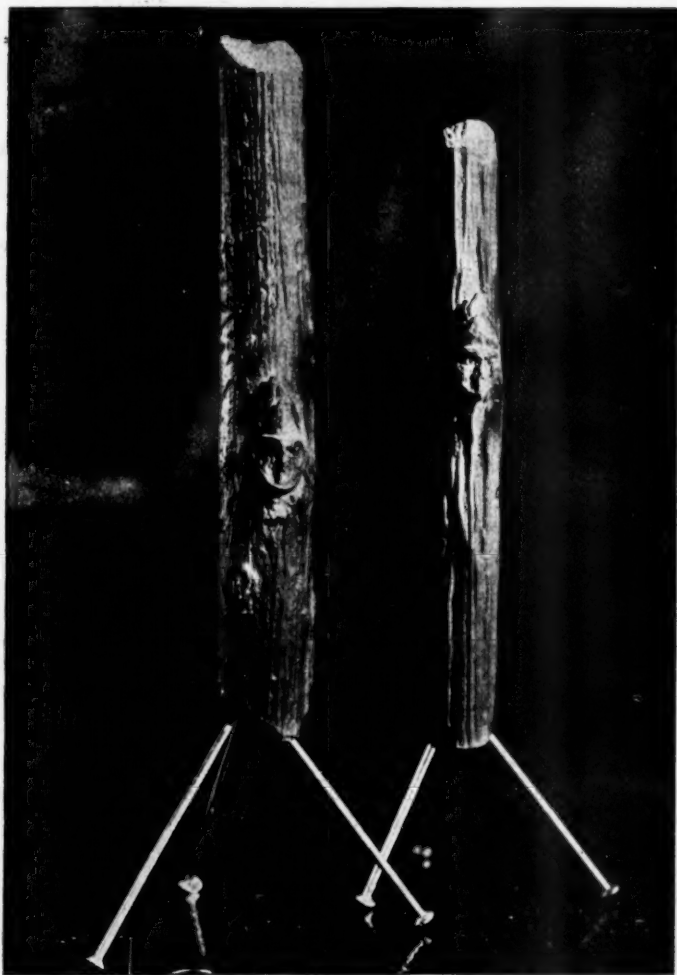
On examining some aconite purchased for cabinet specimens as Japanese aconite (*Aconitum Fischeri*, Reich), it was found to consist entirely of Indian aconite (*Aconitum ferox*, Wallich).

There is no necessity in confounding these drugs one with another, as they differ in a marked degree.

The Indian aconite, called also Bik or Bisk root, or Nepaul aconite is one of the largest of the aconites, often 4 inches long, and an inch or more in diameter. Externally it is prominently longitudinally wrinkled, of a somewhat reddish brown color, the edges of the folds being whitish, internally often horny, showing a five or six-rayed pith.

Japanese aconite is *much smaller*, 1 to 2 inches long, about  $\frac{5}{8}$  of

an inch in diameter, somewhat elongated or napiform, of a uniform brown color, and but little wrinkled.



Leaf Scars on Stems of *Magnolia*.<sup>1</sup>

Internally it is white or mealy, and shows a roundish or about six-rayed pith, the vasa bundles being but few, and only slightly lignified.

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<sup>1</sup> Credit is due Dr. Charles Schäffer for photographing these stems.



APOCYNUM ANDROSÆMIFOLIUM.

An inspection of a root purchased for the Botanical Laboratory of the College, as dogsbane (*Apocynum androsæmifolium*, Linné) showed it to consist entirely of Canadian hemp (*Apocynum cannabinum*, Linné).

This substitution, according to the National Dispensary, frequently occurs, and need not be wondered at, as *Apocynum cannabinum* is the commoner of the two. Prof. Bastin states having seen many acres of our Western plains covered with it.

In talking with a representative of a drug house in this city, from whom I procured what was represented to be dogsbane root, he said it was the only kind kept by them, which he said they sold indiscriminately for either species. On investigation, I found it to be Canadian hemp root.

These roots resemble each other so closely that the difference between them is difficult to determine by even a careful inspection, and yet they differ somewhat in medicinal properties, the *A. cannabinum* being the more active of the two.

A quick method of examination, that does not necessitate the use of a compound microscope, is to make a neat section with a pen-knife and apply the phloroglucin test, when the groups of lignified stone cells (not bast cells, as described by Manheimer in the AMER. JOUR. PHAR., 1881, p. 554) will stain red, and can be readily seen by a magnifier.

LABORATORY NOTES ON OIL OF CASSIA, ELM BARK,  
IPECAC ROOT, POTASSIUM IODIDE, REDUCED IRON  
AND SAFFRON.

BY LYMAN F. KEBLER.

In many minds lingers the erroneous idea that goods contained in original packages, coming from apparently ignorant producers, must be pure. Thus "country beeswax" cannot be adulterated because the bee-keeper is not versed in the art of sophistication; the Chinese are too ignorant to adulterate oil of cassia, etc. That this idea is false and misleading will be supported by many analysts, and corroborated by some of the following results. The data recorded below were obtained from material procured directly from the producers or their agents, and represent the articles as supplied to the wholesale drug trade in general.

## OIL OF CASSIA.

As is well known, this substance is produced in the Orient, and is practically controlled by the Chinese. That it is occasionally found adulterated in original containers is not new to many, but the crudeness of the adulterations is known to a smaller number. In general, the U. S. P. requirements are satisfactory for detecting fraudulent goods, but whenever it is possible the percent. of cinnamic aldehyde should always be estimated. In order to do this, it is necessary to be in possession of a glass flask, about 100 cubic centimetres capacity, with a neck about 13 centimetres long, 8 millimetres internal diameter and graduated in tenths up to 6 cubic centimetres. It is impossible to obtain this flask from dealers in this country at present, but it can readily be secured from Messrs. Schimmel & Co., of essential oil fame.

To estimate the aldehyde in a sample of oil, proceed as follows:<sup>1</sup> into the long-necked flask measure exactly 10 cubic centimetres of the oil; warm the flask and contents well on a water bath, add about 20 cubic centimetres of a 30 per cent. sodium bisulphite solution—a curdy mass results almost immediately—agitate the mixture thoroughly several times, carefully avoiding loss by squirting. The flask is then placed on a hot water bath, and heated until the coagulum has assumed a perfectly fluid state. Add another small portion of the sodium bisulphite solution, shake, and warm on the water bath as before. Proceed in this manner until the flask is about three-fourths filled, the coagulum is completely dissolved and a clear layer of oil floats on the solution. Not a speck of curd must be visible. Remove the flask from the water bath, cool, and fill up the flask with the bisulphite solution or a saturated solution of salt until the oil has completely risen into the neck, and the line of demarcation coincides exactly with the lowest mark on the neck of the flask. The oily portion represents the non-aldehydes, excepting the cinnamic acid which is dissolved by the aqueous solution, contained in the oil. On deducting the number of cubic centimetres of the oily substance from ten, and multiplying the remainder by ten, we obtain the percent. of aldehyde in the oil.

With a pure oil the estimation can be made in one-half an hour, and never more than two hours should be consumed. With an

<sup>1</sup> 1890, Semi-annual Report, Schimmel & Co., Oct., page 15, and 1891, Oct., page 15; 1892, *Odorographia*, by J. C. Sawyer, Vol. I, page 216.

adulterated oil the time is much extended, varying with the amount and nature of the adulterant.

The process yields only approximate results. Duplicates vary from each other as much as 2 per cent.

The following table contains the analytical results obtained from six samples of oil of cassia :

No.	Sp. Gr. at 15° C.	Per Cent. of Aldehyde.	Solubility in 70 Per Cent. Alcohol.	Solubility in Alcohol.	Reaction with Lead Acetate.	Rendered Turbid at	Per Cent. of Residue.
1	1.0566	79.5	Soluble.	Soluble.	None.	—	6.23
2	1.0692	64.0	Soluble.	Soluble.	None.	—	9.84
3	1.0452	56.0	Insoluble.	Soluble.	Precipitate.	18° C.	12.71
4	1.0490	64.0	Insoluble.	Soluble.	Precipitate.	12° C.	13.61
5	1.0428	54.0	Insoluble.	Soluble.	Precipitate.	20° C.	12.87
6	1.0662	40.0	Insoluble.	{ Insoluble in } { equal parts. }	Precipitate.	—	—
7	0.8168	—	Insoluble.	Insoluble.	None.	8° C.	—

No. 1 was obtained from a well-known house, and guaranteed to be pure. No. 2 proved pure according to the U. S. P. requirements, but contained a low percentage of aldehyde. Nos. 3, 4 and 5 were taken from three original containers selected from one consignment. The containers were sealed and marked Yan Loong, which usually represents a high-grade oil. No. 6 was a known mixture of oils of cassia, rosin and copaiba. This mixture was made to test the accuracy of the aldehyde process in the presence of these substances. They did not vitiate the results. No. 7 was petroleum oil, obtained from one of the containers, having been added in excess of saturation.

The residue in all samples except No. 1 was excessive and hard to brittleness. The normal residue varies from 5 to 8 per cent., and is soft, never hard. Ten per cent. is allowable in extreme cases.

#### ELM BARK.

That elm bark does contain starch has been clearly proven by Professor Lloyd.<sup>1</sup> Exactly what it is that interferes with the ordinary starch test is not known. It is even impossible to detect the starchy matter with certainty, with the aid of a microscope magni-

<sup>1</sup> 1895, AM. JOUR. PHARM., 67, 459.

lying .600 diameters, but an addition of starch is immediately revealed by this instrument. The percentage of ash forms a very good basis from which to draw conclusions. That our markets are not free from adulterated elm barks the following analysis will show:

No.	Per Cent. of Ash.	Starch per Microscope.	Color per Lloyd's Test in 5 Minutes.	Color per Lloyd's Test in 1 Hour.	Body of a 1 Per Cent. Mucilage.
1	7.88	None.	Faint blue.	Blue.	Moderate.
2	7.14	None.	Faint greenish-blue.	Blue.	Heavy.
3	3.65	Abundance.	Dark blue.	Black.	Moderate.
4	3.10	Abundance.	Dark blue.	Black.	Moderate.
5	7.68	None.	Decided blue.	Blue.	Light.
6	7.21	None.	Faint greenish-blue.	Blue.	Heavy.

The adulterant of Nos. 3 and 4 was wheat starch, which, according to the percent. of ash, amounted to about 50 per cent. The per cent. of ash runs a little lower than that recorded by Professor Lloyd for a good bark, but the time of gathering may easily account for this. The percent. of ash as recorded above is based on the samples as received, without drying.

In the writer's experience the test for starch will be more satisfactory if the test tubes are set aside for some time to allow the suspended matter to subside. The mixture above the subsided matter will then show a distinct blue.

#### IPECAC ROOT.

This drug, for the past year, has been of a very satisfactory quality. A number of samples examined during the past six months yielded by titration, with volumetric acid solution, the following percentages of alkaloids: 2.10, 2.64, 2.35, 2.36, 2.26, 2.65, 2.43, 2.45, 2.54, 2.65, 2.10, 2.13, 2.45, 2.11, 2.41 and 2.43. This is not an isolated case. Data for a number of other drugs could easily be added that would represent an equally good showing.

#### POTASSIUM IODIDE.

Notwithstanding the high price of this article, there exists very little in the channels of trade that complies strictly with the U. S. P. requirements. Not only is this true of the commercial product, but some of the so-called chemically pure material is also found

wanting. Some of the best manufacturers maintain that the official requirements are too rigid for a medicinal product. In this opinion the writer concurs with them in a measure, but the chemically pure substance certainly ought to comply with these requirements. That the Pharmacopœia is practically disregarded in the manufacture of this chemical, the table below clearly shows :

No.	Alkalies.	Sulphates.	Iodates.	Sodium.
1	Excess.	Present.	Absent.	Absent.
2	Excess.	Present.	Present.	Present.
3	Normal.	Present.	Absent.	Absent.
4	Normal.	Present.	Absent.	Absent.
5	Normal.	Present.	Absent.	Present.
6	Normal.	Absent.	Absent.	Present.
7	Normal.	Absent.	Present.	Present.
8	Normal.	Present.	Absent.	Present.
9	Excess.	Present.	Absent.	Absent.
10	Excess.	Present.	Absent.	Absent.
11	Excess.	Present.	Absent.	Absent.
12	Normal.	Absent.	Present.	Absent.

A trace of free iodine was present in No 7. No other impurities excepting those mentioned in the table above were present. Even the percent. of potassium iodide was normal.

The writer desires to call attention to an inconsistency that exists in the U. S. P. requirements for testing potassium iodide. A limited amount of alkali is admissible. This alkali is always present as a carbonate. The test for sulphates reads as follows: "The aqueous solution should remain clear after the addition of barium chloride T. S. (absence of sulphates)."

An article containing the limit of alkali will always indicate the presence of a sulphate under these conditions, whether the latter is present or not. The requirement should read: "The aqueous solution acidulated with hydrochloric acid should not be rendered turbid after adding, etc."

#### REDUCED IRON.

In examining these samples, the directions of the Pharmacopœia were followed, except that the mixture of mercuric chloride and iron were heated one and a half hours instead of one hour, to ensure a



complete chemical reaction. As a second precaution, the percent. of iron in a sample of steel filings and a sample of wrought iron filings were estimated simultaneously by the same process in the same bath. The following results were obtained:

No.	Color.	Residue.	Metallic Iron.	Sulphides.	Arsenic.	Reaction.
1	Grayish-black.	1'12	52'65	Trace.	Trace.	Neutral.
2	Gray.	0'45	84'34	Trace.	Trace.	Neutral.
3	Black.	2'36	38'60	Trace.	Trace.	Neutral.
4	Gray.	1'48	78'97	None.	Trace.	Neutral.
5	Gray.	1'83	76'05	None.	Trace.	Neutral.
6	Gray.	0'95	81'90	Trace.	Trace.	Neutral.
7	—	2'21	97'11	Trace.	Excess.	Neutral.
8	—	1'01	91'26	Trace.	Excess.	Neutral.

Nos. 7 and 8 represent the iron filings. They were No. 80 powder, that is a little coarser than reduced iron generally, consequently they were less readily acted on by the mercuric chloride. This and the hardness probably account for the lower percent. of iron in No. 8, which was steel.

#### SAFFRON.

For an exhaustive study on the examination of this drug the writer can do no better than to refer the reader to an excellent article by the late Prof. Maisch.<sup>1</sup> Saffron appears to retain its reputation as being largely adulterated. Of the seventeen samples of Spanish saffron examined during the past few years, five were weighted with barium sulphate, three contained added coloring matter, in one of these at least ten per cent. of the yellow filaments were included, one contained fibres resembling fine "excelsior" broken up and dyed, while the remaining eight were pure. Some of the samples contained rather too many yellow styles, not sufficient to pronounce the article adulterated, but a sufficient number to make it quite profitable to the producer to have them there. Even 1 or 2 per cent. would be quite an item with such an expensive drug.

As regards added coloring matter, a word may not be amiss. On adding benzin to a freshly received sample, a decided yellow color was imparted to the former. On adding the benzin to an air-dried sample in the laboratory, no coloration was produced. A sample

<sup>1</sup> 1885, AM. J. PHARM., 52, 487.

procured from Prof. Bastin also proved free from added coloring matter. This was also air-dried. Thinking that there might be a difference on adding the benzin to air-dried material and the samples as received, the sample that indicated added coloring matter was also dried and the test applied again. The coloring was again indicated, but less pronouncedly and less promptly. Different fractions of the benzin were also tried with the same results. Benzin containing fractions varying from 35° C. to 90° C. is just as applicable for this test as the fraction between 50° and 60° C., required by the U. S. P.

In concluding this paper, the writer wishes to state as his experience that drugs and chemicals are less frequently intentionally sophisticated than that they fall a trifle below the standard of purity.

305 CHERRY STREET.

## A CONTRIBUTION TO THE KNOWLEDGE OF SOME NORTH AMERICAN CONIFERÆ.

BY EDSON S. BASTIN AND HENRY TRIMBLE.

(Continued from page 140.)

PINUS ECHINATA, MILLER.

PINUS MITIS, MICHAUX.

SHORT-LEAF PINE, YELLOW PINE.

### GENERAL CHARACTERS.

The yellow pine is a fine, straight-boled tree, attaining a diameter at the base of about 2 feet, and a height of from 50 to 100 feet. Its wood is fine-grained, moderately resinous and durable.

It is found occasionally as far north as Massachusetts, but is more common farther south, from New Jersey to South Carolina and Florida, and along the Gulf States westward as far as Texas. It also occurs in Pennsylvania, east Tennessee, southern Indiana, southeastern Kansas and Arkansas, but is more abundant toward the coast. It occurs in greatest abundance in dry or sandy soils, but is found also in the more fertile ones, where, however, it attains a larger size.

Its branches are smoothish; its leaves in twos, except on thrifty shoots, where they are frequently in threes, from 3 to 5 inches long,

rather slender, often concave on the inner face, deep green, and conspicuously sheathed at their base by sheaths which attain a length of half an inch or more; its cones are rather persistent, ovate,  $1\frac{1}{2}$  to 2 inches long, and with the thickened scales tipped with a minute, weak prickle.

#### MICROSCOPIC STRUCTURE.

A cross-section of the leaf showed usually one convex and one concave or flat side; the excessively thick-walled epidermal cells

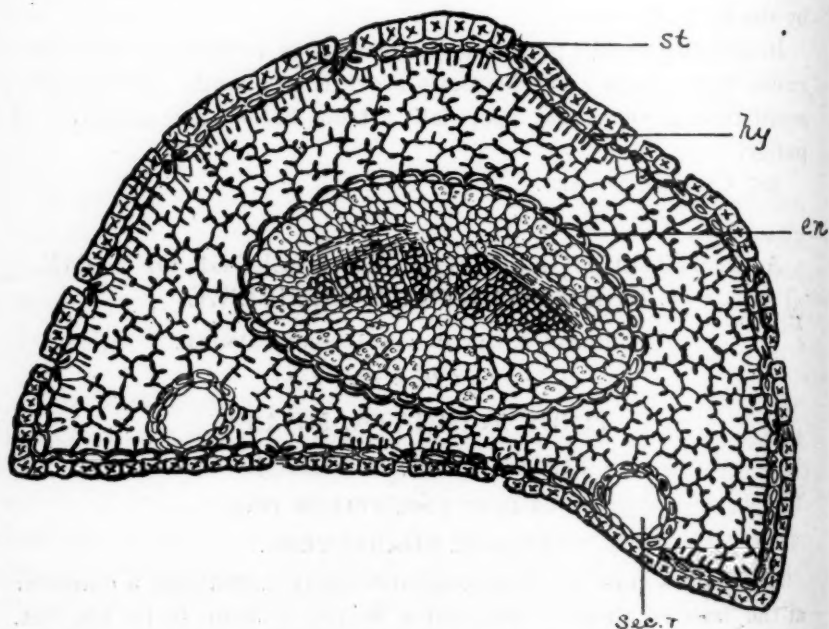


Fig. 17, cross-section of the leaf of *Pinus echinata*, magnified 100 diameters. *St*, stoma; *hy*, hypodermis; *en*, endodermis; *sec. r.*, secretion reservoir.

were of rather large size, and strengthened beneath by a single-layered hypodermis composed of cells that were only moderately thick-walled. The secretion reservoirs, usually two in number, were of large size, strengthened by a circle of moderately thick-walled cells, and located contiguously to the hypodermis on the inner face of the leaf, at a little distance from the angles.

The mesophyll was of the usual folded walled variety. The endodermis had the exterior wall of its cells decidedly thickened. The

transfusion tissue was of the usual character, and the bundles which it enclosed were each about two- or three-rayed.

There were, on the outer or convex surface of the leaf, from ten to fourteen rows of stomata, and on the concave or inner surface from five to seven rows.

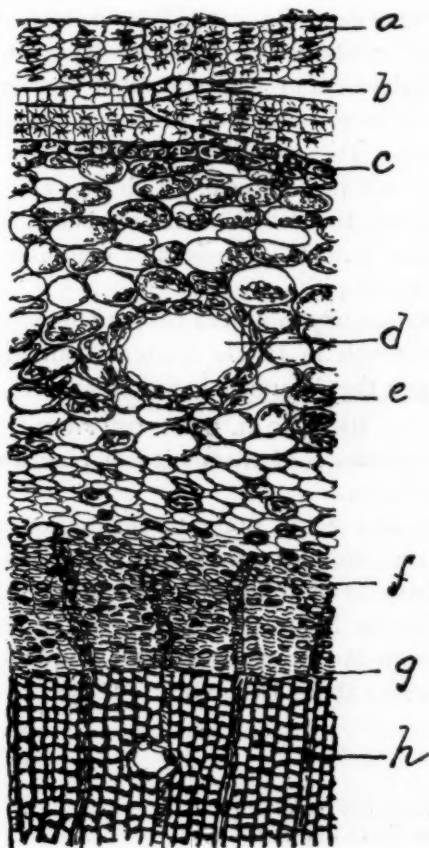


Fig. 18, portion of cross-section of stem of *Pinus echinata*, magnified 100 diameters. *A*, stone cells of periderm layer; *b*, fissure; *c*, phellogen layer, rich in tannic matters; *d*, secretion reservoir in cortex; *e*, tannin cell; *f*, bast layer, containing secretion cells; *g*, cambium; *h*, medullary ray in wood.

A cross-section of a twig of three years' growth showed the following structure: At the outside, a periderm composed of bands of stony tissue alternating with bands of thin-walled cells, which were succeeded interiorly by a phellogen layer rich in tannic matters; inter-

ior to this a cortical parenchyma of considerable thickness, destitute of lignified elements and composed of thin-walled cells of large diameter, mostly elongated in a tangential direction. This portion was observed to be rich in both tannic and resinous matters, and to contain secretion reservoirs and lacunæ of the usual character. The bast layer was also destitute of lignified elements, was for the most part small-celled, contained in its outer layers much crowded and collapsed sieve-tissue, and was sprinkled throughout freely with secretion cells of larger diameter, which contained tannic and oleo-resinous matters. The medullary rays which cross the bast layer were especially rich in oleoresin, which was also abundant in the medullary rays of the wood. The tracheids of the wood contained it to some extent. Tannic and oleoresinous matters were also abundant in the pith.

The microscopic study indicated that the inner bark of this species is somewhat less rich in tannic matters than most of the others examined, though the difference is not great.

#### CHEMICAL COMPOSITION.

The resinous products of the short-leaf pine are by far the most important constituents.

For the purposes of the present contribution, the moisture, ash and tannin of two samples were estimated. One of these was the thick, corky bark of a full-grown tree from Alabama, obtained through Dr. Charles Mohr; the other was the bark of a younger tree, obtained from Mr. Frank Bassett, of Hammonton, New Jersey. Both were collected about December 1, 1895.

	Specimen from	
	Alabama.	New Jersey.
	Per Cent.	Per Cent.
Moisture . . . . .	9.17	8.22
Ash in absolutely dry bark . . . . .	1.32	1.52
Tannin in absolutely dry bark . . . . .	18.19	11.26

The percentage of tannin in the Alabama specimen is, no doubt, too high, as it was associated with considerable coloring matter, which, with our present method of tannin estimation, is unavoidably retained by the hide powder and recorded as tannin.

#### ECONOMICS.

This pine figures somewhat in the turpentine industry. According to W. W. Ashe,<sup>1</sup> there were 3,000 boxes of short-leaf pine cut in

<sup>1</sup> 1894, "The Forests, Forest Lands and Forest Products of Eastern North Carolina," Bulletin No. 5, North Carolina Geological Survey.



one county of North Carolina in 1893; no doubt considerable quantities in other sections. The young trees are the only ones which yield sufficiently to justify boxing; they yield about two-thirds as much turpentine as the long-leaf pine, and can be worked from six to seven years.

The lumber of this tree, while not held in the esteem possessed by the long-leaf pine, is, nevertheless, justly popular. The wood is fine-grained and when devoid of the sap or outer portion, is remarkably durable. It is used largely in ship-building, especially for masts, spars, etc.

### PINUS TAEDA, LINNÉ.

LOBLOLLY PINE, OLD FIELD PINE, FRANKINCENSE PINE.

#### GENERAL CHARACTERS.

The habitat of the loblolly pine is southerly, extending from Florida northward to southern New Jersey and Delaware, and westward as far as Texas and Arkansas. It is most abundant in the coast region, and affects both wet clay and dry sandy soils. When growing in the former it often attains a height of 100 feet or more, and produces a valuable timber; but in dry soils it forms mostly a low, profusely branching tree, whose wood is not durable, being liable to become worm-eaten and rotten. The bark is blackish-gray, rough, and on old trunks much fissured. The male flowers are densely massed, cylindrical,  $1\frac{1}{2}$  to 2 inches long, with from ten to thirteen involucral scales. The cones are elongated, somewhat pyramidal, deflexed, 3 to 5 inches long, of rather loose texture, not hard, and not long persisting on the tree after shedding their seeds. The scales are tipped with a stout incurved spine. The seeds have three roughened ridges on the under side.

The leaves are mostly in threes, sometimes in twos, 6 to 10 inches long, light green, with a close sheath about  $\frac{1}{2}$  inch long at the base. On each of the two flat surfaces are from four to six rows of stomata, and on the convex one from nine to twelve rows.

#### MICROSCOPICAL STRUCTURE.

A cross-section showed the following structure: Beneath the thick-walled epidermis was a two-layered hypoderma, the exterior layer of which was composed of cells with but moderately thickened walls, while those of the inner layer were excessively thickened. The mesophyll did not differ markedly from that of other

species of pines. The resin ducts, usually one opposite each angle of the leaf, and often one opposite the middle of the convex side, were buried in the mesophyll nearly midway between the endodermis and hypoderma, and each was usually bounded by a strengthening layer of thick-walled cells. Endodermis with cell walls scarcely thickened, except the radial walls, which were somewhat so; transfusion tissue of the usual pitted variety, enclosing two diverging bundles, each crossed by two or three medullary rays. Buried in the transfusion tissue, between the outer ends of the phloem of the two bundles, were a few thick-walled fibres, and a few were also

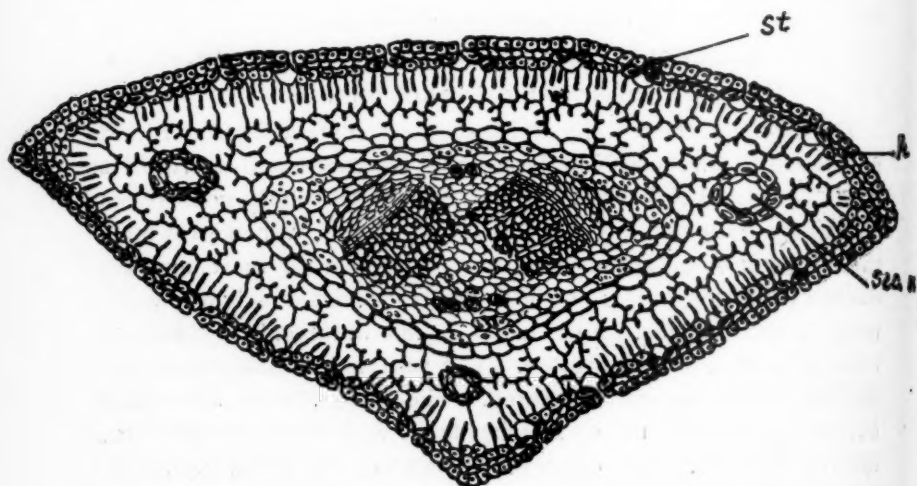


Fig. 19, transverse section of leaf of *Pinus Taeda*, magnified 100 diameters. *St*, stoma; *h*, a cell of the outer of the two layers of the hypoderma; *sec. r.*, secretion reservoir.

found between the inner ends of the xylem masses of the two bundles. The mesophyll cells were observed to contain tannin in abundance, in this respect resembling all the other species examined.

A transverse section of a twig of two years' growth showed the following structure: An epidermis composed of small but very thick-walled cells, supported interiorly by several layers of cells with excessively thickened walls. These were succeeded interiorly by several layers of rather large, thin-walled cells, next to which occurred another zone of very thick-walled cells, apparently an

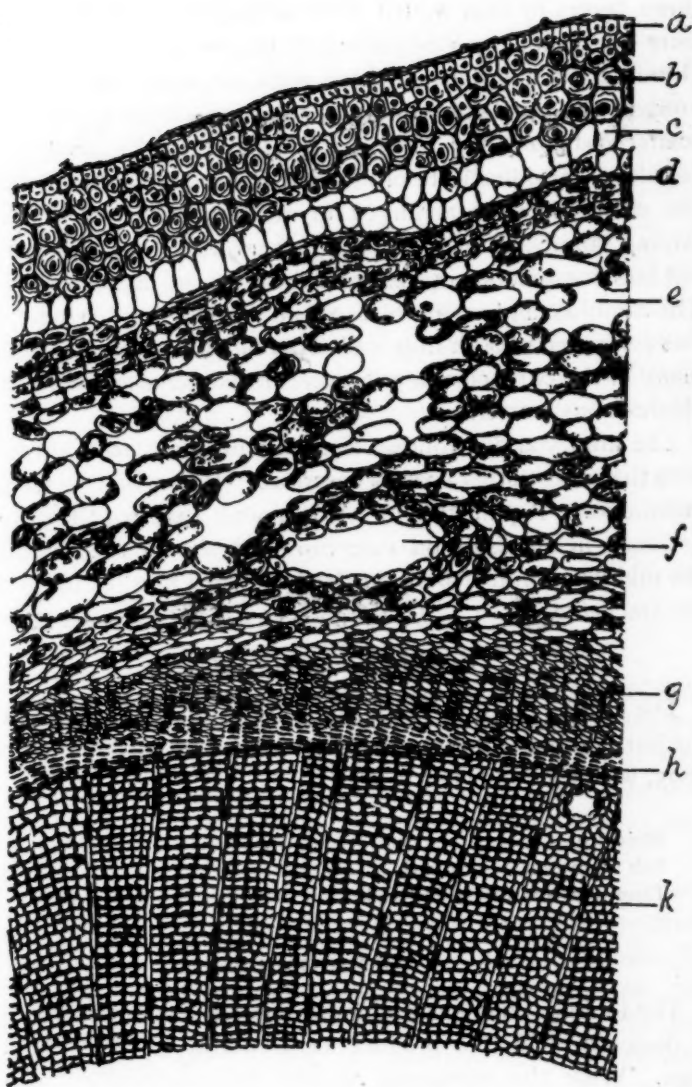


Fig. 20, portion of transverse section of a twig of two years' growth of *Pinus Taeda*, magnified 100 diameters. *A*, epidermis; *b*, sclerotic strengthening cells beneath the epidermis; *c*, layer of thin-walled parenchyma; *d*, thick-walled cells of periderm; *e*, lacuna; *f*, secretion reservoir in cortex; *g*, bast layer; *h*, cambium; *k*, tracheids of the xylem.

internal periderm. Adjoining these on the interior were two or three layers of thin-walled cells arranged in radial rows. These were succeeded by a considerable thickness of large-celled parenchyma, containing lacunæ filled with air, scattered secretion reservoirs of the usual kind in pines, a few crystal cells and numerous scattered tannin and oleoresin cells, but no lignified cells. The bast layer, also destitute of lignified elements, was small-celled, with the cells generally arranged in radial rows. Secretion cells containing tannic and oleoresinous matters were abundant in this layer, but less conspicuous in size than those of the last-described species. The cambium and wood possessed no marked peculiarities. The pith was composed of both thin-walled parenchyma and sclerotic cells, and many of the parenchyma cells were heavily charged with tannic and oleoresinous matters.

The kind and distribution of tannin in this species agreed closely with that in the other species described. It was, however, richer than most, except *P. palustris*, in oleoresinous matters, these abounding not only in the secretion reservoirs, but also in the parenchyma of the middle and inner bark, in the medullary rays, in the pith and in the tracheids.

#### CHEMICAL COMPOSITION.

The tannin, moisture and ash were estimated in a specimen of the bark of the loblolly pine collected near Atlanta, Ga., October, 1895, with the following results:

	Per Cent.
Moisture . . . . .	9.55
Ash in absolutely dry bark . . . . .	1.19
Tannin in absolutely dry bark . . . . .	12.55

#### ECONOMICS.

The loblolly pine is considerably tapped for turpentine, although it does not yield this product as profitably as does the long-leaf pine. With the increasing scarcity of pine lumber, this tree is looked on with more favor than formerly. While its lumber decays rapidly when exposed to the weather, yet it is the only building and fencing material in numerous large sections of the Southern United States. When used for indoor work it lasts well, and compares favorably with other pine lumber.

## PINUS CUBENSIS, GRIESBACH.

CUBAN PINE, SLASH PINE, BASTARD PINE, SWAMP PINE.

### GENERAL CHARACTERS.

This pine occurs on our southern borders from South Carolina to the Florida Keys, and westward to Louisiana; it is also found in the West Indies. It grows in sandy or wet soil, and does not occur far from the coast. It attains a height of from 80 to 100 feet and a diameter at the base of from 2 to 3 feet, and has a laminated, reddish-brown bark. The staminate flowers are from  $1\frac{1}{2}$  to 2 inches long, many in a head, and each subtended by an involucre of about twelve bracts. The cones are mostly in clusters of from two to four, long-conical, 4 or 5 inches long, brown, the thickened scales armed with a short and usually stout, but sometimes rather slender prickle.

Its wood is heavy, tough, resinous, with rather small secretion reservoirs, compact and durable.

The leaves of the Cuban pine are in twos or threes, about 9 or 10 inches long, rounded on the outer and flattish on the inner surface, and subtended at the base by a prominent sheath about  $\frac{1}{2}$  inch in length. The stomata are in about six rows on the flat, and in from eleven to thirteen on the rounded surface.

### MICROSCOPICAL STRUCTURE.

A cross section of the leaf showed an epidermis of very thick-walled cells, supported by a two-layered hypoderma, the outer layer of which was made up of cells with but slightly thickened walls, while the inner was composed of very thick-walled cells. The mesophyll, which abounds in tannic matters, presented no special peculiarities.

The secretion reservoirs were from four to six in number, located in the mesophyll, rather nearer the endodermis than the hypoderma, and those nearest the angles of the leaf were the largest. The sheathing cells had walls which were but slightly thickened. The conspicuous endodermis had only its radial walls perceptibly thickened. The transfusion tissue, which presented the usual structure and arrangement of its cells, surrounds two diverging bundles, each about four-rayed.

The cells between the inner ends of the xylem masses were very loosely arranged, showing lacunæ of considerable size. Occasional thick-walled fibres were recognizable at the outer ends of the



phloem masses, and a few were seen also opposite the xylem ends of the bundles, about midway between them and the endodermis.

The cross-section of a twig of two years' growth showed the following structure: At the exterior, a periderm consisting of thickish-walled cells, which contained abundance of tannic and coloring matters; interior to this, a zone consisting of several thicknesses of cells, whose walls were excessively thickened and lignified; succeeding this, a phellogen layer rich in tannin; next, a thick, cortical parenchyma, composed chiefly of large, thin-walled cells, elongated in a tangential direction, but interspersed with secretion reservoirs, and containing also a few scattered stone cells; a bast layer, composed of

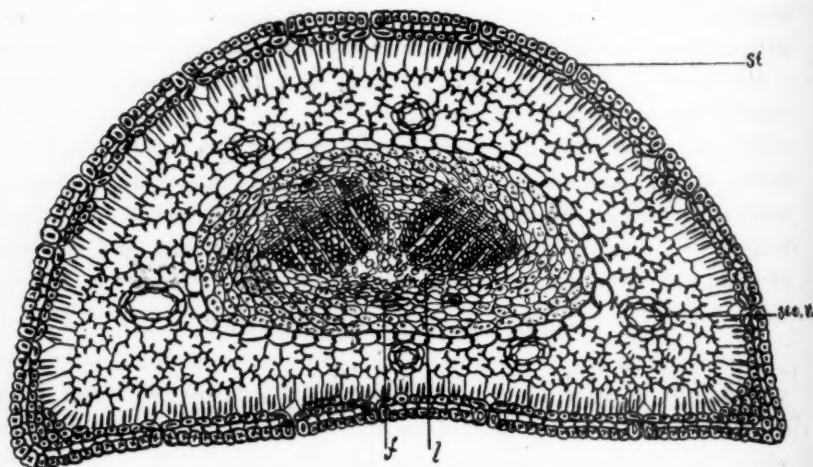


Fig. 21, transverse section of leaf of *Pinus Cubensis*, magnified 75 diameters. *St*, stoma; *sec. r.*, secretion reservoir; *f*, sclerenchyma fibre; *l*, lacuna.

relatively small cells, and destitute of fibrous or other lignified elements, having its tissues mostly arranged in radial rows and interspersed with small secretion cells; a cambium zone, which presented no special peculiarities; a zone of xylem tissues, whose structure resembled that of the other species of its genus; and a pith composed chiefly of thin-walled parenchyma, containing numerous secretion cells.

The tannin was similar in distribution to that in *Pinus Taeda*, and the oleoresinous matters were also similarly distributed, though they appeared to be somewhat less abundant in the specimens studied.

*F*  
Cub  
scl  
cort

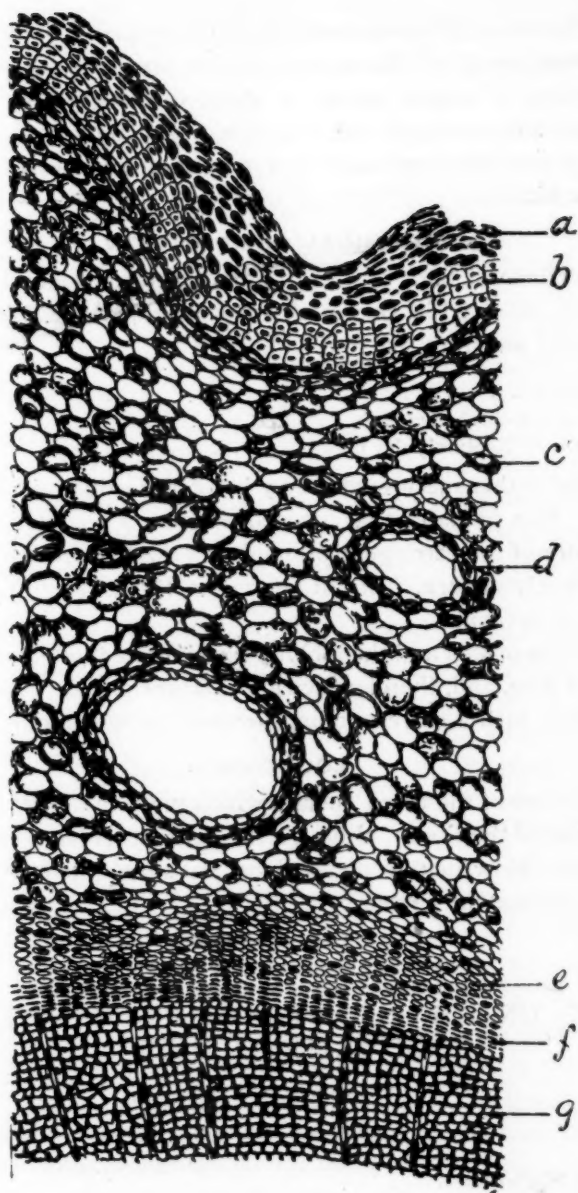


Fig. 22, portion of cross-section of stem of two years' growth of *Pinus Cubensis*, magnified 100 diameters. *A*, disintegrating tissues at exterior; *b*, sclerotic cells of periderm; *c*, tannin cell of cortex; *d*, secretion reservoir in cortex; *e*, bast layer; *f*, cambium; *g*, tracheids of secondary xylem.

The figures of the cross-sections of the stems of these three species, if compared, will show how similar they are as respects the distribution of tannin, for all of these drawings were made from sections which had been cut from the fresh stem and immediately placed in a freshly prepared solution of anhydrous ferric chloride in absolute alcohol.

#### CHEMICAL COMPOSITION.

A specimen of bark of Cuban pine, received from Dr. Mohr, of Alabama, collected in December, 1895, yielded the following percentages of moisture, ash and tannin :

	Per Cent.
Moisture . . . . .	9.04
Ash in absolutely dry bark . . . . .	0.72
Tannin in absolutely dry bark . . . . .	1.36

Evidently this species will never be of any value on account of its tannin. It is probable that a specimen from a younger tree would yield more of the astringent principle, as the bark investigated consisted largely of cork. But in any event, the bark of this species is very poor in tannin.

The resin of this and the loblolly pine is more fluid than that in the long-leaf pine, and, therefore, yields a larger proportion of spirit of turpentine, with a corresponding decrease in the amount of resin.

#### ECONOMICS.

This is one of the three species which yield the great bulk of the turpentine of the South, although the amount obtained from Cuban pine is far below that from the long-leaf pine. The wood is used to a limited extent for lumber.

[To be continued.]

#### NOTES ON THE RECENT LITERATURE OF BOTANY AND MATERIA MEDICA.

BY GEORGE M. BERINGER.

##### Index Kewensis.

This voluminous work, rendered possible only by the munificence and forethought of Mr. Darwin, has been recently completed by the botanists of Kew. It is not only a list of plant names, indicating in each case the family to which the plant has been assigned, but is a bibliographical index of descriptions

and authorities down to the year 1885, and is, likewise, a valuable key to synonymy. It is now announced that a supplement is in course of preparation, to continue the work from 1885 to 1895. It is hoped to publish this supplement during the present year, and this will serve to make the work still more valuable, and place all systematic botanists under a lasting indebtedness to these indefatigable compilers.

**Botanical  
Contributions.**

Another indication of the reviving interest in the study of botany is found in the numerous contributions published by the United States Department of Agriculture, and by the botanical departments of various universities. The Government has rendered valuable service to the science by publishing, as special bulletins from the Division of Botany, monographs and carefully prepared descriptive lists of the special collections made principally in the West, Southwest and in Alaska. These have greatly extended our knowledge of a large portion of our own flora, which had been but imperfectly explored.

Among the important contributions from State universities may be cited, as an example, the "Minnesota Botanical Studies."

**Flora of Yucatan.**

The Field Columbian Museum of Chicago has made a creditable beginning in its first botanical publication, "A Contribution to the Flora of Yucatan," by Dr. Charles Frederick Millspaugh. Our knowledge of the flora of this peninsula and the neighboring islands has been practically limited to the specimens from imperfect collections studied by Professor Hemsley, and described by him in "Biologia Centrali-Americana." The Field Museum has decided to place a collector in this field to accumulate a full knowledge of the flora. The present contribution by Dr. Millspaugh, although intended only as a preliminary catalogue and review of the previous collections, adds considerably to the existing knowledge. In the plants enumerated, we meet quite a number of medical and pharmaceutical interest, such as *Acacia farnesiana*, *Cæsalpinia Bonducella*, *Melia Azederach*, *Ricinus communis*, *Bixia Orellana*. Of the citrus family, the lime (*Citrus Limetta*, Risso) is the most extensively cultivated. The lemon (*Citrus Limonium*, Risso), the orange (*Citrus Aurantium*, L.), and the bitter orange (*Citrus vulgaris*, Risso) are also cultivated to a limited extent.

Of fruits, the *Carica Papaya*, L., is frequent on the islands. The native or natural form, called by the Mayas, *Papaya los Pajaros*, or "Bird Papaya," has nearly globular, non-edible fruit, about 1 inch in diameter. It is commonly cultivated throughout the peninsula, when it is called *Papaya Put*, and is greatly improved in quality. In the island of Cozumel, large, pear-shaped fruit has been raised, from 12 to 16 inches in length and 9 to 12 inches in diameter at the larger end. The pulp is of an orange-red salmon color; rich, juicy and delicious. The flavor is said to improve as the number of seeds in the fruit diminishes.

The *Sapote* (*Achras Sapota*, L.) is natural to many parts of the peninsula, especially in the eastern section, where it often attains a height of 50 to 100 feet. It is widely cultivated for its delicious fruit, which also yields, on puncture, the finest of the Yucatan gum or "Chicle."

The genus *Ipomea* is represented by the following species: *I. Jalapa*, *I. Bona-nox*, *I. puncticulata*, *I. Jamaicensis* and *I. fastigiata*.

*Rhizophora Mangle*, L., is stated to be very plentiful, many small "islands" being composed entirely of this species.

The *Kew Bulletin* for September, 1895, p. 230, under this title, describes the *Dioscorea rhipogonoides*, Oliver, a species of yam indigenous to the mountainous regions of Hong

**Shu-Lang Root.** Kong and Formosa. The plant appears to possess some economic value, and occurs in commerce as "dye-root" or "dye-yam," and in Tonquin the French call it "faux gambir." It is usually gathered in spring and early summer, and is largely shipped to Canton, where it is used to dye grass cloth (*Boehmeria*), and the commoner grades of silk cloth used for summer clothing, a peculiar reddish brown.

The botanical source of the rubber produced in this British possession on the west coast of Africa is now decided at Kew to be *Kickxia Africana*,<sup>1</sup> Benth. (*Kew Bulletin*, October, 1895, p. 241). The name *female rubber tree* is locally applied to the *Kickxia Africana*, to distinguish it from *Holarrhena Africana*.

<sup>1</sup> The seed of this Apocynaceæ originally entered commerce as a variety of *Strophanthus*. See AMERICAN JOURNAL OF PHARMACY, 1895, p. 45.



which is fancifully called the *male rubber tree*. The latter is a Rubiaceous plant, not known to yield any rubber.

The growing importance of this industry is indicated by the fact that for the half year ending June 30, 1895, 588,633 pounds of rubber have been exported from Lagos, valued at £29,765 18s. 5d.

In tapping the tree, the bark is first cut in a vertical direction from the bottom to the top. This main groove is  $\frac{1}{2}$  to  $\frac{5}{8}$  inch broad, and deep enough to reach the inner bark. On each side of this, two series of oblique grooves, about 2 feet apart, are cut, each running into the main groove. The side grooves are made, beginning at the top and gradually reaching the base of the tree. All the milk exuding from the lateral grooves will find its way into the main groove, and so, ultimately, to the bottom, where a vessel is placed to receive it.

Should the new *Kickxia* rubber continue of commercial value, there is no doubt that it will eventually be possible to establish regular plantations, and thus make the industry a permanent one. Owing to the climbing habit of the species of *Landolphia*, which have hitherto yielded African rubber, it was not practicable to cultivate them in regular plantations, as they required the support of other plants, and, when once tapped, many years would have to elapse before they would be fit to yield another crop. With the *Kickxia* these practical difficulties disappear.

#### Ai Camphor.

This is a product obtained from *Blumea balsamifera*,<sup>2</sup> DeC., an evergreen shrubby composite, abundant in Eastern India, and also found in South China and the islands of Hainan and

Formosa. The *Kew Bulletin*, for November, 1895, p. 275, publishes some interesting correspondence regarding its production and mar-

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<sup>2</sup> The *Pharmacographia* describes this camphor, and states "that the chemical examination by Plowman has proved that it has the composition  $C_{10}H_{16}O$ , like Borneo camphor; but the two substances differ in optical behavior, an alcoholic solution of Ngai camphor being levogyre in about the same degree that one of Borneo camphor is dextrogyre. As Ngai camphor is about ten times the price of Formosa camphor, it never finds its way to Europe as an article of commerce. In China it is consumed partly in medicine, and partly in perfuming the fine kinds of Chinese ink."

The *Pharmacographia Indica*, Vol. II, page 252, states that "the camphoraceous *Blumeas* are called by Sanskrit writers *Kukundara* and *Kukkura-dru*, 'dog-bush,' because their pungent odor is attractive to these animals. In

keting. The leaves are collected in the fall and winter months, and are allowed to wilt for a couple of days. They are then placed in a still, consisting of a cask about 2 feet high, open at both ends, and of a diameter suitable to place over a large Chinese frying-pan. The pan is filled with water, and over this is placed a coarse sieve of woven bamboo. The cask is cemented with clay to the edge of the pan, and, after receiving its charge of 30 or 40 pounds of leaves, a large brass basin is placed on the upper end of the cask and is filled with cold water, which is frequently changed. Fire is placed under the frying-pan, and distillation is continued for about four hours. At the end of this time the bottom of the basin is found to be coated with a layer of crystallized substance about  $\frac{1}{16}$  inch thick. This is the crude camphor, or *ngai-fen*. About 15,000 pounds of this crude camphor is annually shipped from Hainan to Canton, where it is refined, and is then known as *ngai-pien*.

*Kew Bulletin*, November, 1895, p. 293.

#### Sumach.

There are three sorts of sumach known in commerce. Venetian sumach or young fustic consists of the twigs of *Rhus Cotinus*. This yields a bright yellow dye, much used in calico printing. North American sumach is yielded by *Rhus glabra*,<sup>3</sup> the fruit, leaves and bark being used for their astringent properties in tanning leather. The sumach of the Mediterranean, and the one more widely used,

addition to *Blumea balsamifera* and *B. densiflora*, which are considered by some botanists as identical, *B. aromatica* and *B. lacera* are considered by the Hindus to be deobstruent and resolvent, and particularly useful in the disease of the nose called *Ahuah*. The powdered leaves are given internally in 2-drachm doses mixed with butter, and also used as a snuff. The juice of the leaves is placed in the eye to cure chronic purulent discharges; it is also used as an anthelmintic and astringent."

Stearoptens have been observed in several other composites, notably in *Chrysanthemum Parthenium*, Pers., and *Inula Helenium*, L. The genus *Pluchea*, likewise belonging to the tribe Inuloideæ, and closely related to *Blumea*, is represented by several species in America. *P. bifrons*, DeC., and *P. camphorata*, DeC., are the Atlantic seacoast representatives. While they have not yet been chemically examined, their characteristic odor indicates that a camphoraceous principle is most likely present.

G. M. B.

<sup>3</sup> The *Kew Bulletin* was evidently misinformed about North American sumach. While some of it is obtained from *Rhus glabra*, the great bulk is gathered from *R. copallina*, chiefly because the latter species yields a larger percentage of tannin than any other sumach in America. *R. glabra* is the only one specified by the U. S. Pharmacopœia.—Editor AM. JOUR. PHAR.

consists of the powdered leaves only of the *Rhus coriaria*, a hardy shrub growing on the rocky slopes of Sicily and elsewhere.

In 1894, the amount of sumach, ground and in the leaf, exported from Palermo to the United Kingdom, amounted to about 3,400 tons, valued at £26,181, whilst the total export of sumach to all countries during the same period was about 25,000 tons, of which France took 10,000 tons, America 5,500 tons, Germany 3,265 tons. The approximate value of the exports of this product in 1894 was £192,923 14s. 8d.

Absolutely pure sumach should contain from 20 to 22 per cent. of tannin as gallotannic acid. However, perfect purity never appears in the market, and a satisfactory quality and one of greater strength than generally sold, would be 20 per cent. tannin calculated as gallotannic acid.

Much of the beauty of the streets and gardens of Southern California is due to the presence of this South American and Mexican tree, the

#### **The Pepper Tree.**

*Schinus molle*, which the Spanish priests carried to California when they established their missions. It is now the most commonly planted shade and ornamental tree in all the region south of the Bay of San Francisco. Travellers from the East usually regard it as a native and typical California tree.

*Schinus molle* is an excellent street tree for dry arid regions. In wet weather the leaves emit a pungent balsamic odor, due to the resin glands with which they abound, and which, when the leaves are placed in water, burst, giving them an apparently spontaneous movement. In Chili, according to Molini, a kind of red wine, agreeable in flavor, but very heating, is prepared from the berries, and from the bark a dye of the color of burned coffee. (*Garden and Forest*, December 18, 1895, p. 502.)

#### **The Jaborandi Leaves of Com- merce.**

Mr. E. M. Holmes, in a paper read before the Chemists' Assistants' Association, and printed subsequently in the *Pharmaceutical Journal*, December 21, 1895, p. 520, reviews, in his usually lucid and interesting style, the history, botany and chemistry of the various commercial varieties of jaborandi. The name jaborandi appears to be applied, in various countries in South America, to a number of plants belonging to the Rutaceæ and Piperaceæ, all possessing sialogogue properties.

(1) *PERNAMBUCO JABORANDI*.—The official jaborandi was first brought to Paris from Pernambuco, by Dr. Coutinho, a Brazilian physician, and was identified by Prof. Baillon, in 1874, as the leaflets of *Pilocarpus pennatifolius*, Lemaire, a plant indigenous to the province of San Paulo. As early as 1875, Mr. Holmes became convinced that the leaves of commerce showed characters distinctly different from those of *P. pennatifolius*, and were more closely allied to those of *P. Selloanus*, Engler. Subsequently, in 1892, he obtained from the Cambridge gardens a flowering branch of a plant which he identified as the source of this variety of jaborandi, and proposed for this species the name of *Pilocarpus jaborandi*.

(2) *PIPER JABORANDI*.—In 1875, the leaves and roots of a species of *Piper* were imported from Brazil under the name of jaborandi. The leaves are thin, papery, grayish, tapering equally to both ends, and have not the large oil cells characteristic of the Rutaceæ. The leaves of *Piper jaborandi*, Vell., *P. reticulatum*, L., *P. citrifolium*, Lam., *P. nodulosum*, Link, and *P. mollicomum*, Kunth, are said to be used under the name of jaborandi. The leaves are generally mixed in commerce with portions of the stem which exhibit the curious enlarged nodes, characteristic of pepper stems, and the equally remarkable stem structure.

(3) *PARAGUAY JABORANDI*.—The leaves of the Pernambuco jaborandi had not been long in commerce when a plentiful supply of jaborandi leaves from Rio Janeiro, and probably also from Buenos Ayres, entered the London market, but it was soon discovered that they yielded much less alkaloid than the Pernambuco kind. The leaflets were thinner than those of the Pernambuco jaborandi, and the leaves had only two or three, never four, pairs of leaflets. The leaflets tapered more to the base, so that the widest portion was above the middle; the lateral veins were not prominent and the upper surface was grayish green. These characters, as well as those of the fruit, seemed to correspond with *P. pennatifolius*, Lem. There is little doubt that the leaves of *P. pennatifolius* have been exported from Paraguay and the neighboring provinces by way of Rio Janeiro and Buenos Ayres.

In 1877, Prof. Baillon examined specimens of all jaborandi sold in Paris during the two previous years. He recognized leaflets of *Piper jaborandi*, *Pilocarpus pennatifolius* and *P. Selloanus*. *P. Selloanus*, Engl., seems very near to *P. pennatifolius*, the chief difference

being that the pedicels of the flowers are half as long again (15 mm.), and that the leaflets are always glabrous; but the fruits met with in the Paraguay jaborandi of commerce never have pedicels so long. The Paraguay jaborandi of commerce is, however, not uniform. There appears also to be two species cultivated at Kew under the name of *P. pennatifolius*. The several species found in Paraguay, and bearing purple flowers, require a more careful examination at the hands of local botanists.

(4) *MARANHAM, OR SMALL JABORANDI.*—In 1893, Mr. T. Wardleworth described another kind of jaborandi, which had been imported into Liverpool. This proved to be a new species, and was appropriately named by Dr. Stapf, *Pilocarpus microphyllus*, as it has the smallest leaves of any known pilocarpus. The leaflets yielded to Mr. Conroy an alkaloid possessing all the chemical properties of pilocarpine. Mons. A. Petit obtained 0.5 per cent. of nitrate of pilocarpine.

(5) *CEARA JABORANDI.*—In 1894, specimens of a new jaborandi were received. The upper surface of the leaflets is a dark brownish green, and the lower a yellowish tint, and covered with short curved hairs. They are smaller than *P. pennatifolius* and have recurved margins. The fruit is short pedicelled and characterized by warty ridges on the back of the carpels. The leaves have only two pairs of leaflets. The leaves yielded only .02 per cent. of crystalline nitrate. Mr. Holmes has named this species *Pilocarpus trachylophus*.

(6) *ARACATI JABORANDI.*—This is evidently from one of the simple-leaved species, probably from *P. spicatus*, A. St. Hil., and is the first appearance of other than the pinnate-leaved species in commerce. The leaves are about the size and very like in shape to those of *Laurus nobilis*. The upper surface is polished and the veins scarcely visible; on the under surface they are more visible, but are very slender. The texture is papery, but rather rigid, brittle, of a dark brownish green above, and of a rather pale hue beneath. The purely lanceolate outline and the short twisted petiole readily distinguish it, whilst the pieces of twig attached show that it is a simple-leaved species. Mons. A. Petit was unable to find pilocarpine in them, although he found a small quantity of another alkaloid.



**Poisoning of  
Plants.**

F. W. Cord describes, in *Garden and Forest*, experiments tried at the Agricultural College, Lincoln, Neb., in order to decide the effects of poisonous substances upon plant life. The experiments were undertaken in order to practically test the statements of physiologists that the roots of plants have little or no power of selecting their food, and can be poisoned like animals. The experiments were tried by subjecting corn and beans, previously germinated and developed a few inches, to solutions of alcohol, corrosive sublimate, sulphuric acid, extract of aconite, arsenic and strychnine. From the results the following conclusions are deduced:

(1) Irritant poisons, such as arsenic, corrosive sublimate and sulphuric acid, kill plants in water cultures in a very short time, except in .01 per cent. solutions, and in such solutions plants were less vigorous than in city water.

(2) The neurotic poisons, alcohol, aconite and strychnine, killed no plants, with the exception of the very strong solution of alcohol and one plant treated with strychnine.

(3) All the poisons used, except alcohol, affected beans more quickly and severely than corn. Alcohol, on the contrary, affected corn more than beans.

(4) The poisons produced much greater effects in water than in soil cultures.

The strongest solution of aconite and strychnine used contained only one-tenth of 1 per cent.; hence, it is possible that a stronger solution might have a different effect; yet the same strength of arsenic and corrosive sublimate killed plants very quickly. The results are more striking when it is remembered that from 20 to 40 times as much arsenic or corrosive sublimate is required to prove fatal to animals as of strychnine sulphate. The irritant or corrosive poisons, however, attack and decompose tissue; hence, may be expected to injure plants as well as animals. The neurotic poisons affect only the nerves of animals, and are, therefore, less likely to injure plants.

**Poisonous Influence of Various Species of Cypripedium.** In Bulletin No. 9, Part VII, of the Minnesota Botanical Studies, Prof. D. T. MacDougal directs attention to the fact that the leaves and stems of *Cypripedium spectabile* and *C. pubescens* exert a poisonous influence on the human skin. The

first observations were made on plants in the open air in the localities in which they grew. The subsequent experiments were made with plants cultivated in a greenhouse in which were no known poisonous plants. Careful tests were made with *C. spectabile* on nine persons, six of whom were poisoned in a degree corresponding to the manner of application of the plants to the skin. *C. pubescens* gave about the same results, and *C. parviflorum* also exhibited dermatic action.

Specimens of the pointed and glandular hairs found in abundance over the entire plant were removed and touched separately to the skin. It was shown that the irritant action was due to the secretion of the glandular hairs only. If the development of the glandular hairs is followed, it will be found that the secretion begins to accumulate in the distal end of the cell shortly before it reaches maturity and filters through the wall, forming a reservoir between the wall and the outer cuticle layer. On account of the extreme small quantity of the secretion, its exact chemical nature could not be ascertained. It was found to be soluble in alcohol, and gave the reactions of an oily substance.

It was found, further, that the irritant action of the plants on the skin increased with the development of the plant, and reached a maximum effect during the formation of the seed capsules. This corresponds with the activity of the glandular cells and the amount of secretion present.

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*Phosphate Production.*—For the past year or two a good deal of apprehension has been felt by phosphate producers in this country and elsewhere, as to the competition of the African deposits. The extent of those deposits was outlined in *The Mineral Industry*, Vol. III, but their present importance has been very much exaggerated by general report. The Tunisian mines are not yet worked to any considerable extent, and, according to *l'Engrais*, the total production of Algeria in 1895 was 121,475 metric tons, which is only a very small amount compared with the total consumption of Europe alone. At present, very little work is in progress, owing to the difficulties over the concessions at Tebessa and elsewhere. Our Florida producers have, apparently, no occasion to be alarmed at African competition for some years to come. A more formidable interference with their business is found in the rapidly increasing use of Thomas slag as a source of supply of phosphoric acid. The quantity of this slag produced in Germany and Belgium is growing, and its application in the manufacture of fertilizers has been promoted by its abundance and cheapness, so that it has become a considerable article of commerce.—*The Engineering and Mining Journal*, February 1, 1896.

## EDITORIAL.

## THE SEVENTY-FIFTH ANNIVERSARY OF THE PHILADELPHIA COLLEGE OF PHARMACY.

The Philadelphia College of Apothecaries was instituted February 23, 1821. Organization was effected about one month later, March 27, when officers were elected. The present year, therefore, is the appropriate time in which to hold the seventy-fifth anniversary of the foundation of the College. Neither of the foregoing dates being a convenient time for the exercises of such an occasion, the 22d of April was selected as being more suitable. At that time the celebration will take the nature of a banquet to members of the College, the Alumni Association and invited guests.

It may be noted, in this connection, that in 1871 the fiftieth anniversary of the College was celebrated in a similar manner. Among the prominent speakers on that occasion were Drs. Rogers and Leidy, of the University of Pennsylvania; Dr. S. D. Gross, of the Jefferson Medical College, and Professors Parrish and Procter, of the Philadelphia College of Pharmacy. None of these men have survived the twenty-five years which have elapsed since then.

## THE METRIC SYSTEM IN THE UNITED STATES.

We are gratified to note that a bill for the adoption of the metric system of weights and measures in this country, similar to the one printed last month (page 165), has been favorably reported by the Committee on Coinage, Weights and Measures, and will, no doubt, be brought up at some future time before the House of Representatives for action.

## REVIEWS AND BIBLIOGRAPHICAL NOTICES.

THE SCIENCE OF NUTRITION. By Edward Atkinson. Also, THE ART OF COOKING IN THE ALADDIN OVEN, with directions and many recipes. Sixth thousand. Boston: Damrell & Upham, 1896.

The efforts of the author have been directed to the perfection of a scheme whereby separate families, of moderate means, living in their own houses, may secure wholesome, nutritious food, well cooked, without it being necessary for any member of the family to devote so much time to the preparation of the food as might seriously hamper the effort of the family in maintaining itself. To the accomplishment of this end, he has invented and perfected the Aladdin oven, with which the cooking for an ordinary-sized family may be accomplished with an ordinary kerosene lamp. The principles involved consist, firstly, in utilizing all the heat evolved, and, secondly, in subjecting the food to a moderate temperature for four or five hours, instead of one hour or less, as is the case with the present methods of cooking. The new apparatus being practically air-tight, the food is not allowed to become dry during the prolonged heating; on the contrary, the natural moisture and flavor are retained.

Dr. Atkinson has long been known as a political economist of the first class, and his unselfish labors on the subject of foods has taken practical shape in the present volume. First published in 1892, it has, in four years, made many converts to the new methods. Through the liberality of Mr. Andrew Carnegie,

the book has recently been placed in 3,500 public libraries, so we may expect to hear more concerning it in the future. Any system which will tend to reduce the cost and waste of food and fuel, as this one does, ought to become popular with the masses.

THE CHEMISTRY OF THE AUSTRALIAN INDIGENOUS VEGETATION. By J. H. Maiden. Presidential address before the Chemical Section of the Australasian Association for the Advancement of Science.

In discussing this subject, Mr. Maiden endeavored to answer the following questions: (1) What has been done in the direction of chemically investigating our indigenous plant products? (2) What remains to be done? (3) How can it best be done? In answering these questions, quite a variety of subjects have been covered, notably: "Human foods and food adjuncts," in which the native mannas are treated in a scientific and interesting manner. "Gums, resins, kinos, eucalyptus oils, other essential oils, fixed oils, perfumes, dyes, tans, timbers and fibres," all receive a full share of attention, and the necessity of investigating these different substances is dwelt on in forcible language. A section is also devoted to "substances reported medicinal (drugs)" and the resources of Australia in this connection clearly set forth.

ANNALES DE L'INSTITUTE COLONIAL DE MARSEILLE. Published under the direction of Professor Edouard Heckel. Lille, 1895.

This volume is made up of five interesting contributions, as follows:

"Contribution to the study of Robinia Nicou, from a botanical, chemical and physiological standpoint." By E. Geoffroy.

"Contribution to the botanical, therapeutical and chemical history of the genus Adansonia." By Dr. Charles Gerber.

"On Quassia Africana and Pancovia Heckeli, which is substituted for it." By Dr. L. Claudel.

"On Bakis (Tinisporea Bakis, Miers) and Sangol (Cocculus Leaeba, G. P. et Rich), of Senegal and Soudan." By Edouard Heckel and Fr. Schlagdenhauffen

"A study of Psidium (Goyavier)." By M. Khouri.

All of these contributions are illustrated, and the whole is a record of research work that will have a permanent value.

ÜBER EINIGE JAPANISCHE NAHRUNGSMITTEL. By Dr. Oscar Loew. Tokyo Japan.

PRELIMINARY NOTES ON THE BARK OF CARISSA OVATA, R. BR., VAR. STOLONIFERA, BAIL. By J. H. Maiden and H. G. Smith.

ANTITOXINS. Gibier's Double Antitoxin. Tetanus and Streptococcus Antitoxins. From the Biological and Vaccinal Department of the New York Pasteur Institute, through Lehn & Fink.

This pamphlet of thirty-four pages gives a full account of the various serums manufactured by the above-mentioned institution. Most of them are obtainable in both liquid and dry condition. A number of well-executed illustrations add to the interest of the contribution.

CONTRIBUTIONS TO A KNOWLEDGE OF AUSTRALIAN VEGETABLE EXUDATIONS, NO. 1. By J. H. Maiden and H. G. Smith.

ON A NATURAL DEPOSIT OF ALUMINUM SUCCINATE IN THE TIMBER OF GREVILLEA ROBUSTA, R. BR. By J. H. Maiden and Henry G. Smith.

THE RELATIONSHIP OF THE HEAT OF VAPORIZATION OF GASES TO THEIR DENSITY AND ALSO TO THEIR BOILING POINT. By Wm. L. Dudley. Reprint from the *Journal of the American Chemical Society*, December, 1895. From his investigations the author enunciates the following law: "In any homologous series, the heat of vaporization in a unit of volume of the vapor, under the same conditions as to temperature and pressure, is proportional to the density and also to the absolute boiling point."

SOLUZIONE FERRUGINOSA ARSENICALE. By Dr. G. Siboni. Reprint from the *Bollettino Chimico-Farmaceutico*, November, 1895.

PROSPECTUS OF THE TWENTY-FOURTH ANNUAL SESSION OF THE CALIFORNIA COLLEGE OF PHARMACY. San Francisco, California, 1896. Unlike the Eastern colleges, the session of this Institution commences April 14th and closes October 28th.

BOTANICAL PRODUCTS OF THE UNITED STATES PHARMACOPŒIA, 1890 (particularly of plants found in Indiana). By John S. Wright. Botanical Department of Eli Lilly & Co., Indianapolis, Indiana.

LIST OF PUBLICATIONS OF THE U. S. DEPARTMENT OF AGRICULTURE, from 1841 to June 30, 1895, inclusive. Washington, 1896.

MERCK'S 1896 INDEX. An encyclopædia for the physician and pharmacist, stating the names, synonyms, source or origin, chemical nature and formulas, physical form, appearance, properties, melting and boiling points, solubilities, gravities, percentage strength, physiological effects, therapeutic uses, modes of administration, doses, incompatibilities, antidotes, and market values of the chemicals and drugs used in medicine, chemistry and the arts.

THE PHARMACAL GAZETTE. A monthly journal devoted to the interests of pharmacy. J. E. Morrison, editor and publisher.

Volume I, No. 1, of this new publication presents a creditable appearance, and it offers a large amount of valuable reading matter, covering a wide range of pharmaceutical subjects. We hope the editor will be able to continue to give as much in each succeeding number.

THE ICONOCLAST, an ephemeris issued at intervals. By Herbert B. Harrop and Louis Wallis. Columbus, O. January and February, 1896.

REPORT OF THE PROCEEDINGS OF THE ILLINOIS PHARMACEUTICAL ASSOCIATION. Sixteenth Annual Meeting, 1895.

THE COMMON SCHOOL LAWS OF PENNSYLVANIA. Revised and arranged by Nathan C. Schaffer. Harrisburg, Pa. Pp. 395.



## MINUTES OF THE PHARMACEUTICAL MEETING.

PHILADELPHIA, March 17, 1896.

The sixth regular Pharmaceutical Meeting was held in the Museum of the College at 3 o'clock.

Mr. E. M. Boring presided, and the minutes of the previous meeting were allowed to stand.

The first paper, entitled "A Proximate Analysis of *Polygala Senega*," was read by Mr. J. Henry Schroeder (see page 178).

Professor Trimble remarked upon the proportion of albuminoid matter, stating that 20 per cent. is rather a large amount to find in roots, and that it is probably stored as reserve material. Professor Lowe also thought this to be the case, as the drug contains neither starch nor inulin.

Mr. Lyman F. Kebler read the next paper, which was entitled "Laboratory Notes" (see page 193), and under this head he included results of experiments with oil of cassia, elm bark, ipecac root, potassium iodide, reduced iron and saffron. These experiments were mostly for the purpose of detecting impurities and adulterations.

Mr. Kebler found that benzin extracted the coloring matter from air-dry saffron, which contains about 14 per cent. of moisture, more readily than it did from the drug previously deprived of moisture.

Professor Trimble did not think that the amount of moisture in the air-dry drug would interfere with the action of the benzin, and that the failure to dissolve the coloring matter in the latter instance was probably due to a change caused during the process of drying.

Mr. Wallace Procter spoke of a spongy gray iron which was formerly much used, and which was quite pure in most respects, except a slight contamination of sulphide.

Prof. Remington said that this product was formerly manufactured by Messrs. L. Martin & Co., of New York, and that the presence of a small percentage of sulphide was owing to insufficient washing of the ferrous carbonate used in its manufacture. The sulphide was changed into hydrogen sulphide when brought into contact with the liquids of the stomach, causing unpleasant eructations.

Prof. Remington also referred to the difficulties into which the Ohio Food and Dairy Commissioners have gotten in the stand they have taken in regard to the pharmacopœial requirements or to the construction which they have put upon the food laws of the State. He said the important question to be considered was the kind and amount of impurity, and whether it would interfere with the physiological action of the drug containing it, and mentioned in this connection the needless high standard of the tests for the alkaloidal salts of cinchona, the unnecessary expense incurred in removing the last 1 or 2 per cent. of moisture from ether, and the presence of potassium carbonate in potassium iodide, which is an advantage rather than an objection.

Prof. Lowe then read a paper entitled "Botanical Notes" (see page 191). His paper was accompanied by specimens of Japan and Indian aconite roots, stems of *Magnolia*, roots of *Apocynum androsaemifolium* and *Apocynum Cannabinum* and a dried specimen of *Anthemis nobilis*.

Miss Bertha L. DeGraffe read an interesting paper on "*Opuntia Vulgaris*"

(see page 169). The economical uses of the plant were considered, it being grown in the South for hedges, and also used for feeding cattle. The juice of the fruit, which is a beautiful purplish-red color, is used for coloring wine. Accompanying the paper were specimens of the plant and fruit, and photographs of the same, and also a sample of an aqueous extract of the coloring substance. It was stated that ammonia changes the color and could possibly be used for detecting this substance in wine.

Mr. Boring wished to know what is understood by a neutral Basham's mixture. Mr. F. W. Haussmann said that this was a prescription of a certain physician who wishes the acetic acid omitted from the preparation, and also that he desires four times the iron strength of the official preparation.

Prof. Trimble called attention to the following-named specimens: Licorice seeds, which were purchased in New York City for 20 cents per ounce, and were intended for planting; two samples of kino, which were presented by Baron Ferd. von Mueller, of Melbourne, Australia, and were from *Eucalyptus regnans* and *Eucalyptus globulus* respectively; two samples of tungsten ore, known as Scheelite and Wolframite (presented by Mr. Bullock), a sample of an Egyptian sugar from vacuum pan and centrifugal, polarizing 99 per cent.; one of a Mexican sugar made by evaporating cane juice to dryness, and about like maple sugar, and one which came from Guadaloupe.

Prof. Remington presented, on behalf of Mr. Chas. Bullock, a filter folder which was of French manufacture, and was introduced into this country about thirty-five years ago. It seems to have no other value than that of a museum specimen.

Prof. Trimble read a "Note on Distilled Water," by Prof. J. U. Lloyd (see page 187), referring to some statements made in a former paper on this subject.

Prof. Ryan considered it important to direct the attention of druggists to a kind of advertising which might cause a reflection on themselves. Some wholesale firms put up packages of compressed herbs, and enclose with the packages pamphlets which are extremely objectionable.

Mr. Boring desired information in regard to the legal status of Canadian and English chemists, which would enable them to sell phenacetine in this country for 65 cents per ounce. He said that an agent from Montreal, Canada, had made him such an offer, and welcomed any legal action which might be taken against him (the agent). No definite statements could be made in regard to this matter, for it seems that no test cases have come up.

On motion, the meeting adjourned.

T. S. WIEGAND,  
*Registrar.*

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According to G. W. A. Kahlbaum (*Berichte*, 29, 69) the condenser bearing Liebig's name was invented by Christian Ehrenfried Weigel, and described by him in his dissertation of March 25, 1771 (Liebig was born in 1803). Weigel's condenser was described in Goettling's "Manual of Chemistry," 1794, and Liebig, when he first described the use of this condenser, mentioned the source from which he had obtained the description of the apparatus.—O. Hehner, in *The Analyst*.